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***Results of a Confidential Study for the Presence of
Ammonium Perfluorooctanoate in Air at a
Manufacturing Facility***

Barr Project No. 32/01-002-001

***Prepared for
Whiteman Osterman & Hanna LLP
Albany, NY***

April 2006

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Ammonium Perfluorooctanoate

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Executive Summary

Barr Engineering Company (Barr) performed a study to determine the presence and concentration of ammonium perfluorooctanoate (APFO) in air at a confidential client facility. Study sample collection was performed on November 22, 2005. Samples were collected from the air at a facility that uses APFO containing dispersions to coat manufactured products.

Barr designed the study in cooperation with Exygen Research and the facility management, and conducted the sample collection. The samples were analyzed by Exygen Research.

Six air samples were collected and submitted for analysis, including one field blank of the sample collection media. All samples, except for the media blank sample, exhibited the presence of APFO. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) guideline for APFO of 0.01 mg/m^3 was used in the evaluation of area air monitoring results since there were no OSHA permissible exposure levels or NIOSH recommended exposure levels to use for comparison.

The averages for air samples taken in several areas of the facility ranged from 1.2% to 62.7% of the ACGIH TLV guideline for eight-hour employee inhalation exposure to APFO. Area air samples reflected highest concentrations in manufacturing areas where APFO containing dispersions were being applied and dried. One sample taken in an area away from manufacturing activities, an employee break and lunchroom, saw the lowest air concentration of APFO in air. Representative employee exposure monitoring, conducted with APFO monitoring in locations where employees perform work activities, demonstrates that it is unlikely that the ACGIH TLV would be exceeded under similar working conditions.

Study results may be used to determine material or engineering changes to manage the presence of APFO in air and to evaluate possible changes to hygiene and work practices within the facility. They may also be used as baseline data to evaluate plant conditions at a later time under similar or alternate conditions.

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Introduction

Barr Engineering Co. performed study design in cooperation with facility staff and legal advisors. An initial meeting and site survey was conducted with a Whiteman Osterman & Hanna LLP representative and facility staff on September 22, 2005. Initial determinations of the areas to be sampled and number of samples were determined. Barr provided an updated and final proposal to Scott Fein, Esq. on November 18, 2005 defining the scope of work, schedule, and cost assumptions for the study.

Sampling was performed on November 22, 2005. Specific sample locations and number of samples were finalized with plant personnel on the mobilization day previous to sampling. Tim Russell of Barr performed the sampling with coordination assistance from facility staff.

Barr collected area samples to determine APFO content in the air in various areas of the facility. The study was not designed to measure specific employee exposure to APFO. Air sample results are intended to be representative of conditions at the facility at the time that the samples were collected and may be compared to the published ACGIH TLV as a general measure of the plant air quality with respect to APFO concentration. The collection of air samples in certain areas was predicated upon activities that involve the production of aqueous fluoropolymer dispersion (AFD) coated and dried products; including mixing of AFD coatings with proprietary additives prior to application, coating of web substrates, and drying the web(s) to provide the desired properties in the finished or intermediary products.

The following table lists the general characterization of the areas sampled and the number of air samples collected.

Plant Area Characterization	Number of Air Samples
Building #4 Lunchroom	1
Building #4 Mixing Room	1
Building #4 Oven Room	1
Building #5 Oven Room	1
Building #6 Oven Room	1

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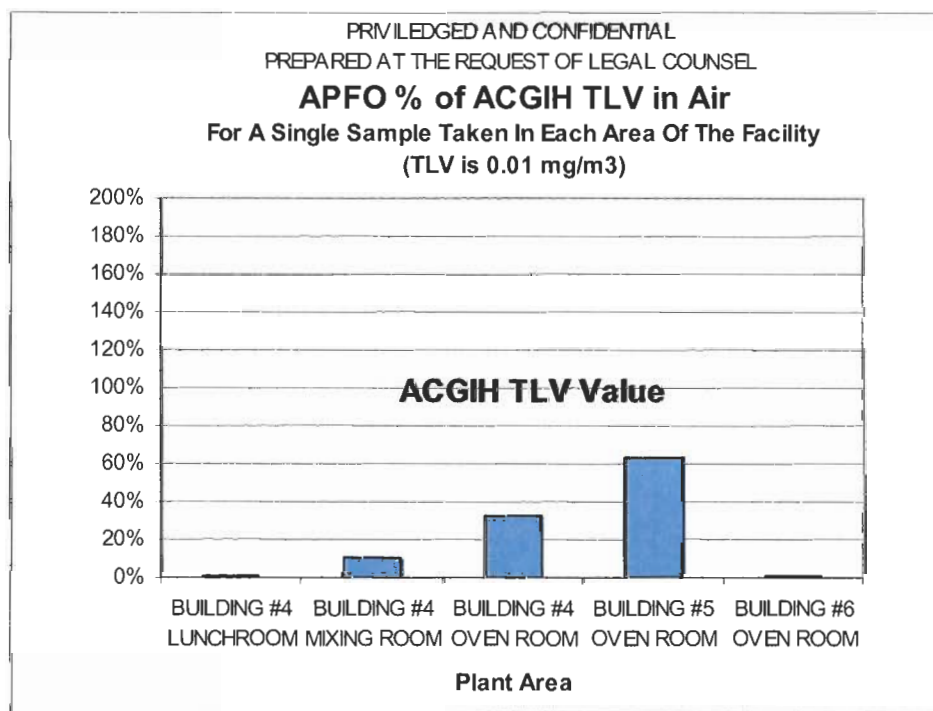
Study results may be used to determine material or engineering changes to manage the presence of APFO in air. They may also be used as baseline data to evaluate plant conditions at a later time or under various conditions.

Results and Discussion

Results of the area air monitoring samples collected for determination of APFO concentrations on November 22, 2005 are presented and discussed in this section. Specific recommendations regarding equipment, personal protective equipment (PPE), training and practices to be considered as potential improvements are also made based upon observations made during the study mobilization.

Area Air Monitoring

Table 1 presents the results of the area air monitoring. The table presents each measured APFO value, observations of facility activity and the percent relationship to the ACGIH TLV guideline. Area samples reflected highest air concentrations in manufacturing areas where APFO containing dispersions were being mixed, applied and dried. APFO air concentration in one non-manufacturing area, the Building 4 lunchroom, was the lowest measured value as illustrated in the chart below.



The plotted values are the percent relationship to the recommended TLV for the samples taken in each area. The recommended TLV is 0.01 milligrams APFO/cubic meter air (mg/m³). In addition,

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the plot shows the highest value measured—62.7 percent of the recommended TLV in the Building 5 oven room. There appeared to be normal activities in all areas of the facility during the shift.

When APFO is dispersed in an aqueous mixture, its volatility is suppressed, because of the chemical's affinity to water. There is no specific temperature at which APFO begins to move into the vapor phase. Many variables in addition to temperature have been suspected to impact its volatility, such as the physical properties and other components of the mixture and the physical properties and other components of the air. When the moisture content of the air begins to increase the volatility of APFO is believed to increase. The thermal decomposition of APFO has been studied and is well documented.¹ The rate of thermal decomposition increases with temperature. The extent of decomposition also increases with temperature. Decomposition occurs rather rapidly at 350 °C (662 °F). If held for approximately one second at 350 °C, more than 99% of the APFO would decompose.² Decomposition occurs much more slowly at 196 °C (385 °F). Given that the half-life of APFO at 196 °C is 43.8 minutes [Krusic and Roe], the vapor would have to be held at that temperature for over five hours to accomplish 99% destruction.

Figure 1 provides a site map of the facility with the identification of the sample locations included in this study. Figure 2 contains photographs of the sampling equipment at each sampling location. Four of the five sampling locations were in Buildings 4 and 5, which are connected and the drying ovens in those buildings are ventilated to one common fume eliminator. Building #6 is separate and located some distance away from Buildings #4 and #5. Its drying ovens are also served by a separate ventilation system and fume eliminator.

The study results are notable in that APFO air concentrations are much higher in the Building #4 and #5 manufacturing areas (mixing and oven rooms) as compared to those in the Building #6 oven room. APFO is liberated from AFD coatings in drying and baking process steps and may be destroyed during the final sintering stage of the drying oven if the air stream is subjected to suitably high temperatures for a sufficient period of time. The Building #4 lunchroom appears to be sufficiently removed from the manufacturing areas given that it had the lowest measured concentration of APFO

¹ Gas-Phase NMR Technique for Studying the Thermolysis of Materials: Thermal Decomposition of Ammonium Perfluorooctanoate, Krusic, P.J. and Roe, D.C., Anal. Chem., 76:3800, 1 July 2004

² Dispersion Processor Material Balance Report, Barr Engineering, KHA Consulting, and Keller and Heckman LLP, EPA Docket on PFOA, February 2005

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in air. Although observations regarding the difference in APFO ambient air concentration in Buildings #4 and #5 versus that in Building #6 are drawn from a limited number of samples, several differences in these areas may contribute to recommendations for further study or specific improvements. A table is provided below that with individual observations that may be drawn from the study results and recommendations to be considered:

	Observation	Recommendation
1	Barr speculates that the measured APFO level in the mixing room air is more likely due to it's location in Building #4 (immediately adjacent to the Building #4 oven room) than from activities in the mixing room itself. APFO is not typically liberated from ambient temperature AFD mixing processes. Though air velocities appear low, it is likely the mixing room hood is drawing some air from the adjacent oven room into the mixing room area.	Consider redesigning the mixing room ventilation system to provide local supply air ventilation and air exhaust at each mixing station, rather than the area ventilation of the entire workspace that is provided by the current ceiling mounted mixing room exhaust hood. Localized ventilation may provide the benefit of drawing less air from the oven room. Also, localizing the ventilation reduces the potential for vented particles, mists or fumes to be drawn across the breathing zone of employees while working in the mixing room.

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2	<p>Buildings #4 and #5 are both older than Building #6. The Building #6 oven exhaust ventilation system may be relatively free of leaks that could contribute APFO to the indoor air from the drying ovens when compared to the Building #4 and #5 oven exhaust ventilation systems due to differences in building and ventilation system age and condition. This belief is further reinforced by the fact that the highest APFO reading in air was measured in the Building #5 oven room, where the ventilation ducts from Building #4 drying ovens combine with and passes through the Building #5 oven room.</p>	<p>Inspect the condition of the Building #4 and #5 oven exhaust ventilation system and repair any leaks in the system duct work and ovens. Consider studying the ventilation rates of the components of the Building #4 and #5 ventilation systems to verify that they are performing as designed and at acceptable ventilation rates at each drying oven.</p>
3	<p>Buildings #4 and #5 are served by one common ventilation and Fume Eliminator system, while Building #6 is served solely by a similar system. The exhaust from a large number of drying ovens is routed to the common Building #4 and #5 Fume Eliminator, while only three ovens are exhaust ventilated by the Building #6 Fume Eliminator. Both fume eliminators are similar in size and duct air velocities are governed by pressure differential switches that control fan speed. Thus, it is unclear why there was a lower measured APFO rate in Building 6. It may be due to the better performance of the newer coating ovens and/or greater quantity of make-up air that creates better air mixing within the room.</p>	<p>Inspect the condition of the Building #4 and #5 Fume Eliminator and verify its operating condition and that it is performing to design specifications. Compare the quantity of make up air added to Buildings #4 and #5 to determine if equivalent quantities of makeup air are available to operate each oven efficiently.</p>

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4	The measured APFO concentrations in air of this study are based on a limited number of samples. APFO air concentrations may vary during different operating scenarios, different seasonal building ventilation conditions, and at different sampling points within each area of the facility. Specific areas of potential concern include the upper areas of the drying ovens when facility staff is working to thread a new web through the oven, the ventilation ducts during periodic cleaning, and the area in and around the Fume Eliminator during maintenance and repair operations.	Consider conducting additional air monitoring to further document APFO concentrations and to provide guidance for engineering controls, changes to work processes, or respiratory protection in areas that may exceed the TLV under certain conditions.
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The project was not designed to provide a thorough study of facility ventilation system(s) or in depth recommendations regarding work station improvement or modifications. However, the above observations and recommendations are intended to provide guidance for further study or actions that can be taken to assess or improve facility performance.

Facility Work, Safety and Hygiene Practices

Barr observed operations at the facility for each area undergoing air sample collection over a limited period of time at the facility and has extensive experience with similar facilities. This report is not intended to provide a comprehensive assessment of facility work or hygiene practices; however basic recommendations regarding equipment, personal protective equipment (PPE), training and practices can be made from our observations to be considered as potential workplace improvements.

General behavior in the manufacturing areas of the facility was varied with respect to safe work practices, the use of personal protective equipment, and conformance to established safety requirements. It appears that the client is providing suitable equipment and training and yet individual choice appeared to frequently guide behavior and performance. Given that, and the potential risks of variability in behavior, the client is encouraged to continue building a safety culture reinforced by all levels of management. The table below provides observations and recommendation regarding facility work, safety, and hygiene practices:

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	Observation	Recommendation
1	Inconsistent use of available PPE to limit skin contact with AFD.	<p>Fluoropolymer dispersions contain residues of fluorinated wetting agents which should not come in contact with the skin. It is necessary to wear protective gloves and other protective clothing and equipment to prevent skin contact when handling these products.³</p> <p>Flush skin with water after contact.⁴</p> <p>Enforce the use of gloves and other protective clothing or equipment during operations where the potential for skin contact exists.</p> <p>Require employees to practice good personal hygiene when leaving work area.</p>

³ Fluoropolymers Division of the Society of Plastics Industry, "Guide to the Safe handling of Fluoropolymer Resins", 3rd Edition, June 1998, Page 35

⁴ Ibid, Page 46

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2	All employees working in areas where AFD is in use and the potential exists for contact should wear uniforms during the work shift and change into street clothes prior to departing the facility. This should be extended to include footwear as well.	To prevent traces of fluoropolymer resin powders being carried out of the work area on clothing, personnel should be given the opportunity to store their work clothing separate from their street clothing (double locker or separate changing rooms). Employees should be provided with adequate washing facilities and encouraged to use them regularly. ⁵ Wash contaminated clothing before reuse. ⁶
3	Spillage of AFD creates a slip and fall hazard. This was observed to occur during oven dip pan cleaning operations.	Fluoropolymers spilled during handling should be cleaned and appropriate measures should be taken to prevent the creation of a slippery surface. It is advisable that some form of anti-slip flooring or similar preventative measures be provided in areas where fluoropolymer resins are regularly handled. Slippery surfaces in working areas pose increased accident risks. ⁷
4	Noise levels in the Building 6 oven room were perceived as high by the Barr observer.	Consider performing noise monitoring to confirm or deny that noise levels are above that which would require the use of hearing protection.

⁵ Ibid, Page 35

⁶ Ibid, Page 46

⁷ Ibid, Page 37

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5	Although not observed during the study mobilization, duct cleaning and Fume Eliminator repair and maintenance activities likely have a potential for contact with concentrated residue that may contain high levels of APFO.	Staff maintaining, cleaning or repairing these systems should wear appropriate PPE, including face splash protection, impervious coveralls, heavy chemical resistant gloves and boot covers. Sampling of the residue may moderate the level of PPE if the residue is found to have trace levels of APFO.
6	APFO is liberated from AFD at elevated temperatures. Staff working on the drying oven towers (especially near the top of the tower, not at ground elevation) during operations may be exposed to APFO at levels above those measured in the study.	Consider measuring APFO air concentrations at the elevated areas around the drying ovens where employees work periodically. Use the sampling results to evaluate the need for implementing engineering controls (ventilation), changing work practices to reduce potential exposure, or providing PPE (respiratory protection) to address the potential for exposure.

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Process Description

The facility consists of multiple single story buildings in the client's manufacturing campus. Manufacturing activities that involve AFD at the campus include web coating and oven curing of the web to produce PTFE coated fabric, tapes and laminates

Aqueous fluoropolymer dispersion is mixed prior to application in one area described as the Building 4 mixing room. Buildings 4, 5, and 6 contained multiple ovens where fabric webs are coated and cured in a process that dries and bakes the webs and sinters the PTFE coating to the fabric. Facility activities are detailed below for the mixing room and oven rooms. All other areas of the building appeared to have routine operations throughout the sampling day.

Building #4 Oven Room

- Had four ovens running of which;
- Oven #7 was running 4 rolls (full capacity)
- Oven 8 was running 4 rolls (full capacity)
- Oven 10 was running 4 rolls (full capacity)
- And Oven 11 was running one wide roll (50% capacity).

The high range of oven temperatures was in the vicinity of 725 degrees F.

All these ovens were running standard PTFE dispersions.

Building #5 Oven Room

- Had five ovens running of which
- Ovens CB and CC were each running one roll (full capacity)
- Ovens CI and CJ were running three rolls on each (full capacity)
- And CK Oven was running one wide roll (full capacity)

The high range of oven temperatures was in the vicinity of 760 degrees F.

And ovens CB, CC, CI and CJ were running ceramic filled dispersions where as Oven CK was running standard PTFE dispersions.

Building #6 Oven Room

- Was running a standard load. No ceramic filled dispersions were being run.

The high range of oven temperatures was in the vicinity of 760 degrees F.

Mixing Room Area

- Was mixing ceramic dispersions and a drum of Mix6868 in the back mixing room and standard PTFE dispersions in the front (main) mixing room area. This is considered a normal work load for this area.

Sampling Procedures and Methods

There are no standardized methods for determination of APFO in air. An air sampling method was used for the area sampling that determined APFO concentrations by drawing air through an organic vapor sampling (OVS) tube at the rate of approximately one liter per minute. Air samples were collected during the day shift, approximately 9 AM to 4 P.M., or 420 minutes. The sample media from each sampling location was then labeled, sealed and shipped to Exygen for analysis. Concentrations were determined by dividing the reported APFO mass by the air sample volume. The result is a time-weighted concentration. The result may be compared to the published ACGIH TLV.

Sample pumps were calibrated on site before and after the shift and the arithmetic mean flow rate used to calculate the air sample volume. The OVS tubes consist of a glass housing with three separate collection media—a filter followed by two resin sorbent sections. APFO is found in particulate matter and is generally collected efficiently on a filter media. A majority of the APFO measured in the study samples was found on the filter fraction of each sample. The two resin sections following the filter in the OVS tube are analyzed separately to determine if APFO has broken-through the filter. All OVS samples had quantifiable APFO mass in the first resin section, at levels at least one order of magnitude below the measured mass on the filter. All samples showed APFO above the detection limit in the second resin section, at masses below that in the first resin section indicating efficient capture of the sample for analysis. The reported detection limit for the air analysis was 0.05 µg/fraction—samples below this value are reported as Not Detected (ND). All three air sample fractions for the media blank sample were reported as ND.

Observation notes were made about every hour to check that the pumps were operating and to document the level of manufacturing activities in the area. No problems were encountered during sample collection.

Laboratory procedures and methods are described in Exygen's report in Appendix B.

Review of Quality Assurance Data

A data validation of the Exygen Research (Exygen) data for the Ammonium Perfluorooctanoate (APFO) analyses of OVS tubes contained in the Exygen report #L0006869 was completed. The results of this validation are included in the following paragraphs.

All analysis was performed using high pressure liquid chromatography (HPLC) with a tandem mass spectrometric detector (MS/MS). In general, the areas covered by the validation process were, holding times, analytical methodology, calibration procedures, blank analysis, precision and accuracy, analytical quantitation, data package completeness, and an overall data assessment. All raw data was validated to ensure compliance in all areas.

All analytical holding times (analysis within 60 days of collection) were met, all analytical methods followed were appropriate, all calibration procedures were followed and all laboratory blanks were non-detect for all target parameters. Sample precision and accuracy were evaluated using laboratory control samples and comparing them to set criteria (70 -130% recovery for spikes and <30% relative percent difference for duplicates). All laboratory control samples met all acceptance criteria. All analytical identification and quantitation procedures were evaluated and no quantitation errors were detected. An isotopically labeled perfluorooctanoic acid surrogate was spiked on each OVS tube prior to sample extraction and analysis. The percent recoveries of this compound from each sample were compared to established criteria (70-130%). One sample (Building 5 Oven T1R4) had a percent recovery (169%) above the set criteria. Based on the review of the data, it was determined that this criteria exceedance was due to the level of APFO present in the spiked sample and does not reflect a larger quality assurance issue. No qualification of the data was performed based on the data review process.

Overall the laboratory data met the project requirements. The final data met the project data quality objectives and should be considered acceptable as reported.

Table 1
Result for APFO Concentration
in Area Air Samples

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TABLE 1

Confidential Study with Exygen Research
Result for APFO Concentration in Area Air Samples

Sample Location	APFO Mass/ sample µg	Average Calibration l/min	Elapsed Time min	APFO Concentration mg/m ³	Percent of TLV ¹	Activity Observations ²
BUILDING 4 LUNCHROOM	0.05043	1.0037	420	1.2E-04	1.20%	Sampler located above lunchroom refrigerator @ 0853 No employees present @ 1015, 1118, and 1515 Four employees present at 1212, five employees @ 1418, and 2 employees @ 1553
BUILDING 4 MIXING ROOM	0.45954	0.9974	421	1.1E-03	10.94%	Sampler located on workstation serving mixing room @ 0857 No employees present with two mixing stations operating @ 1022 No employees present with three mixing stations operating @ 1333, 1422, and 1517 One employee present with two mixing stations operating @ 1214 One employee present with three mixing stations operating @ 1120 and 1558
BUILDING 4 OVEN ROOM	1.38271	0.9992	420	3.3E-03	32.95%	Sampler located at end of Oven 8 ~ 3 feet above dip pan @ 0902 Ovens 7, 8, 10, 11 operating during the shift. Between 3-6 employees in area during the shift White dust of unknown origin noted near sampling pump.
BUILDING 5 OVEN ROOM	2.63431	0.9980	421	6.3E-03	62.70%	Sampler located on workstation between Oven CF and CK @ 0910 Ovens CB, CC, CI, CJ and CK operating during the shift Between 3-6 employees in area during the shift
BUILDING 6 OVEN ROOM	0.06128	1.0024	420	1.5E-04	1.46%	Sampler located on Oven B workstation @ 0924 Ovens A, B, and C operating during the shift Two employees in area during the shift
Media Blank	ND					

¹ Threshold Limit Value, 0.01 mg/m³

² Observations were spaced roughly hourly for entire shift

ND = Not Detected, response between 0 and 0.05 µg/sample fraction

Figure 1
Site Map and Sample Locations

A hand-drawn site map of a facility, likely a food processing plant, showing buildings 1 through 6 and various associated rooms and infrastructure. The map includes the following details:

- Buildings:** Building 1 (top left), Building 2 (middle left), Building 3 (bottom right), Building 4 (center), Building 5 (center right), and Building 6 (top right).
- Rooms and Areas:**
 - Oven Room:** Located in Building 4 and Building 5.
 - Cafeteria:** Located in Building 4.
 - Mixing Room:** Located in Building 4.
 - Leach Field:** Located near Building 1, labeled "LEACH FIELD FOR BUILDING 6 (OUTFALL 005)".
 - Storm Water Discharge:** Located near Building 4.
 - Stream:** Labeled "UNNAMED STREAM" and "TREES" along the right edge.
 - Grass:** Several areas are labeled "GRASS".
 - Asphalt:** Several areas are labeled "ASPHALT".
 - Road:** Labeled "ROAD" at the bottom right.
- Infrastructure and Utilities:**
 - Septic Tanks:** "SEPTIC TANK (TO OUTFALL 002)" near Building 1, "SEPTIC TANK (FROM BUILDING 5)" near Building 5, and "SEPTIC TANK" near Building 4.
 - Propane:** "PROPANE LINE" and "PROPANE TANKS" are indicated.
 - Wastewater:** "WASTEWATER UST" (Underground Storage Tank) near Building 6, "WASTEWATER" near Building 5, and "WASTEWATER" near Building 4.
 - Fume Eliminators:** Two locations are marked "FUME ELIMINATOR".
 - Well #1 R&F:** Located near Building 1.
 - Well #2 R&F:** Located near Building 5.
 - Well #3 R&F:** Located near Building 6.
 - Well #4 R&F:** Located near Building 4.
 - Well #5 R&F:** Located near Building 5.
 - Well #6 R&F:** Located near Building 6.
 - Well #7 R&F:** Located near Building 4.
 - Well #8 R&F:** Located near Building 4.
 - Well #9 R&F:** Located near Building 4.
 - Well #10 R&F:** Located near Building 4.
 - Well #11 R&F:** Located near Building 4.
 - Well #12 R&F:** Located near Building 4.
 - Well #13 R&F:** Located near Building 4.
 - Well #14 R&F:** Located near Building 4.
 - Well #15 R&F:** Located near Building 4.
 - Well #16 R&F:** Located near Building 4.
 - Well #17 R&F:** Located near Building 4.
 - Well #18 R&F:** Located near Building 4.
 - Well #19 R&F:** Located near Building 4.
 - Well #20 R&F:** Located near Building 4.
- Other Labels:** "SOIL MOUND" near Building 6, "WASTEWATER UST", "FUME ELIMINATOR", "PROPANE TANKS", "DRY WELL", "OUTFALL 003 (APPROXIMATE)", "OUTFALL 001", "OUTFALL 002", "OUTFALL 003", "OUTFALL 004", "OUTFALL 005", "OUTFALL 006", "OUTFALL 007", "OUTFALL 008", "OUTFALL 009", "OUTFALL 010", "OUTFALL 011", "OUTFALL 012", "OUTFALL 013", "OUTFALL 014", "OUTFALL 015", "OUTFALL 016", "OUTFALL 017", "OUTFALL 018", "OUTFALL 019", "OUTFALL 020".

OVEN ROOM
BLDG # 6

CAFETERIA

CHARGE
OVEN #8
BLOG #4

REF
Well #2

OVEN CF
BLDG #5

Well #1
REF

Mixing Room
BLDG #4

**Ambient Air
Sampling Locations
November 22, 2005**

Figure 2
Photographs of Air Sampling Locations





Appendices

Appendix A

Report Calculations and Nomenclature

Confidential Study with Exygen Research
Calculations for APFO Concentration in Area Samples

Sample Location	Fraction	APFO Mass/ fraction ng/fraction	APFO Mass/ sample µg	Pretest Calibration l/min	Posttest Calibration l/min	Average Calibration l/min	Elapsed Time min	APFO Concentration mg/m ³	Percent of TLV ¹
BUILDING 4 LUNCHROOM	A	46.4	0.05043	1.008	0.9993	1.0037	420	1.2E-04	1.20%
	B	2.72							
	C	1.31							
BUILDING 4 MIXING ROOM	A	452	0.45954	1.011	0.9837	0.9974	421	1.1E-03	10.94%
	B	6.01							
	C	1.53							
BUILDING 4 OVEN ROOM	A	1370	1.38271	1.008	0.9904	0.9992	420	3.3E-03	32.95%
	B	10.5							
	C	2.21							
BUILDING 5 OVEN ROOM	A	2600	2.63431	1.009	0.9869	0.9980	421	6.3E-03	62.70%
	B	30.4							
	C	3.91							
BUILDING 6 OVEN ROOM	A	49.3	0.06128	1.008	0.9967	1.0024	420	1.5E-04	1.46%
	B	9.42							
	C	2.56							
Media Blank	A	ND	ND						
	B	ND							
	C	ND							

¹ Threshold Limit Value, 0.01 mg/m³

ND = Not Detected, response between 0 and 0.05 µg/fraction

Appendix B

Laboratory Reports and Sample Chain of Custody

Analytical Report

Determination of Ammonium Perfluorooctanoate (APFO) in OVS Airtube
Samples

Oxygen Report No. L0006869

Testing Laboratory

Oxygen Research
3058 Research Drive
State College, PA 16801

Requester

Tim Russell
BARR Engineering Co.
4700 West 77th Street
Minneapolis, MN 55435-4803
Phone: 952-832-2600

1 Introduction

Results are reported for the analysis of ammonium perfluorooctanoate (APFO) in OVS airtube samples received at Exygen from BARR Engineering. The Exygen project number assigned to the samples is L0006869. Table I lists the analyte quantitated for the samples.

Table I. Target Analytes

<u>Parameter</u>	<u>Acronym</u>
Ammonium Perfluorooctanoate	APFO

2 Sample Receipt

Six OVS airtube samples were received at Exygen. The OVS airtube samples were split into three fractions each. A total of twenty-one samples were analyzed, including laboratory controls. A copy of all sample log-in information is presented in Attachment C.

The samples were received on November 29, 2005. The samples were delivered on ice by FEDEX. Exact shipping details can be found in Attachment C. The samples were stored refrigerated from time of receipt until analysis.

3 Holding Times

The maximum holding time for completion of analysis is sixty days from sample collection. All holding times were met for this data set.

4 Methods - Analytical and Preparatory

4.1 OVS Airtube Sample Extraction

All seven OVS airtubes were fortified with 1 ng of ^{13}C PFOA by spiking 10 μL of a 100 ng/mL solution directly onto the glass fiber frit. The airtubes were allowed to air-dry at room temperature for several minutes before being disassembled for the extraction. For extraction, the airtubes were disassembled into three fractions, with each fraction being placed into individual 20mL glass scintillation vials. Fraction A consisted of the plastic retaining ring and glass fiber frits. Fraction B consisted of the first section of XAD resin beads and the first PUF filter. Fraction C consisted of the last section of XAD resin beads and PUF filter. Next, 1.0 mL of HPLC grade methanol was added to each vial. Each sample was mixed for ~30 seconds. The

process was repeated two more times at ~10 minute intervals. The extract was then withdrawn from the vials using disposable glass pipettes and transferred to 2mL HPLC vials. The extracts were analyzed using electrospray LC/MS/MS.

4.2 Sample Analysis by LC/MS/MS

In High Pressure Liquid Chromatography (HPLC), an aliquot of extract is injected and passed through a liquid-phase chromatographic column. Based on the affinity of the analyte for the stationary phase in the column relative to the liquid mobile phase, the analyte is retained for a characteristic amount of time. Following HPLC separation, mass spectrometry provides a rapid and accurate means for analyzing a wide range of organic compounds. Molecules are ionized, fragmented, and detected. The ions characteristic of the compounds are observed and quantitated against extracted standards.

An HP1100 system interfaced to a Micromass Quattro system was used to analyze the sample extracts for quantitation. A gradient elution through a Jones Chromatography Genesis C-8 50 x 2.1 mm x 4µm column was used for separation.

The following gradient was performed:

Mobile Phase (A):	2mM Ammonium Acetate in Water
Mobile Phase (B):	Methanol

<u>Time</u>	<u>%A</u>	<u>%B</u>
0.0	60	40
1.0	10	90
7.0	10	90
7.5	0	100
9.0	0	100
9.5	60	40
13.5	60	40
14.0	60	40
15.0	60	40

The following parameters were used for operation of the mass spectrometer:

Parameter	Setting
Ionization Mode	Electrospray
Polarity	Negative
Transitions Monitored	413->369 (PFOA); 415->370 (¹³ C PFOA)
Gas Temperature	350°C
Drying Gas (N2)	7.0 L/min

5 Analysis

5.1 Calibration

An 8-point calibration curve was analyzed throughout the analytical sequence for PFOA. The calibration points were prepared at 0.05, 0.1, 0.2, 0.5, 1.0, 5.0, 10, and 50 ng/mL (ppb) for LC/MS/MS analysis. The instrument response versus the concentration was plotted for each point. Using linear regression with 1/x weighting, the slope, y-intercept and coefficient of determination (r^2) were determined. A calibration curve is acceptable if $r^2 \geq 0.985$.

For the results reported here, calibration criteria were met. The calibration curves are included in the raw data in Attachment C.

5.2 Surrogates

For OVS airtube samples, ^{13}C PFOA was added to the top of the tube in the laboratory before the extraction. ^{13}C PFOA is used as a surrogate for OVS airtube samples.

^{13}C PFOA recoveries can be found in Attachment B.

5.3 Laboratory Control Spikes

The laboratory control spike in the analytical set was prepared by adding a known concentration of the analyte to a laboratory control airtube. Laboratory control spikes are used to assess method accuracy. The laboratory control spike must show recoveries between 70-130% or the data is rejected. For the results reported here, the laboratory control spikes were within the acceptable range.

5.4 Matrix Spikes

There were no matrix spike samples in the set of OVS airtubes.

6 Data Summary

Please see Attachment A for a detailed listing of the analytical results. Results are reported in ng/fraction for the analyte for OVS airtube samples on an as-received basis.

7 Data/Sample Retention

Samples are disposed of one month after the report is issued unless otherwise specified. All electronic data is archived on retrievable media and hard copy reports are stored in data folders maintained by Exygen. Hardcopy data is stored for a minimum of five years. The client will be notified 30 days prior to the disposal of hardcopy data.

8 Attachments

- 8.1 Attachment A: Chain of Custody
- 8.2 Attachment B: Analytical Results
- 8.3 Attachment C: Raw Analytical Data

9 Signatures

Christine E. Edwards 12/22/05
Christine Edwards, Laboratory Technician Date

John M. Flaherty 12/22/05
John M. Flaherty, Vice President Date

Summary of APFO in OVS Tubes

Sample ID	Analyte Found (ng/fraction)
	APFO
Sample Media Blank T1R0 A	ND
Sample Media Blank T1R0 B	ND
Sample Media Blank T1R0 C	ND
Building 4 office T1R1 A	46.4
Building 4 office T1R1 B	2.72
Building 4 office T1R1 C	1.31
Building 4 mixing T1R2 A	452
Building 4 mixing T1R2 B	6.01
Building 4 mixing T1R2 C	1.53
Building 4 oven T1R3 A	1370
Building 4 oven T1R3 B	10.5
Building 4 oven T1R3 C	2.21
Building 5 oven T1R4 A	2600
Building 5 oven T1R4 B	30.4
Building 5 oven T1R4 C	3.91
Building 6 oven T1R5 A	49.3
Building 6 oven T1R5 B	9.42
Building 6 oven T1R5 C	2.56

ND = Not Detected. Response between 0 and 0.05 ng/fraction.

Recovery Summary for PFOA in OVS Tubes

Sample ID	Analyte Added (ng/mL) PFOA	Analyte Found (ng/mL) PFOA	Recovery
Control 1 A Spk	2.0	1.81	91

Recovery Summary for ¹³C-PFOA in OVS Tubes

Sample ID	Analyte Added (ng/mL) ¹³ C-PFOA	Analyte Found (ng/mL) ¹³ C-PFOA	Recovery (%)
Sample Media Blank T1R0 A	1.0	0.948	95
Control 1 A	1.0	0.877	88
Building 4 office T1R1 A	1.0	0.896	90
Building 4 mixing T1R2 A	1.0	0.923	92
Building 4 oven T1R3 A	1.0	1.30	130
Building 5 oven T1R4 A	1.0	1.69	169
Building 6 oven T1R5 A	1.0	0.839	84

Login

Login Group: L0006869

Login #:	6980	Conform COC Sample:	True
Project:	P0001903	Conform COC:	True
Company Name:	Barr Engineering	Conform Sample:	True
Submitted By:	Tim Russell	Conform Request:	True
Login Type:	Immediate Receipt of Samples		
Started:	True		
Date Start:	11/30/2005		
Due Date:	12/10/2005		
Received Date:	11/29/2005		
Received By:	Ammerman, Mark		
Spread Sample:			
Label:			
Exygen SD/PI:	Risha, Karen		
Project Title/Type:	Analysis of APFO in OVS Tubes by LCMSMS / ROUTINE		
Login Notes:			

Packages / Containers

Package	Carton	Date / Condition		Shipper / ID	Temp. Control/Temp.	Direction / Handled By
PK0007957		Received Date: 11/29/05 10:18 Package & Contents Uncompromised		FEDEX 4532 9210 4227	Wet Ice 4.8	RECEIVED Ammerman, Mark
Container #	Gross Weight	pH	Container Type	Preservative	Mfg. Lot	Mfg. ID
C0123806	6.70 g		Air tube	NONE		
C0123807	6.70 g		Air tube	NONE		
C0123808	6.70 g		Air tube	NONE		
C0123809	6.50 g		Air tube	NONE		
C0123810	6.50 g		Air tube	NONE		
C0123811	6.50 g		Air tube	NONE		
C0123812	6.50 g		Air tube	NONE		
C0123813	6.50 g		Air tube	NONE		
C0123814	6.50 g		Air tube	NONE		
C0123815	6.50 g		Air tube	NONE		
C0123816	6.50 g		Air tube	NONE		
C0123817	6.50 g		Air tube	NONE		
C0123818	6.60 g		Air tube	NONE		
C0123819	6.60 g		Air tube	NONE		
C0123820	6.60 g		Air tube	NONE		
C0123821	6.60 g		Air tube	NONE		
C0123822	6.60 g		Air tube	NONE		
C0123823	6.60 g		Air tube	NONE		
C0123824	6.50 g		Air tube	NONE		
C0123825	6.50 g		Air tube	NONE		
C0123826	6.50 g		Air tube	NONE		

Samples

<u>Sample ID</u>	<u>Container</u>	<u>Matrix</u>	<u>Fraction</u>	<u>Sample</u>	<u>Date Sampled</u>	<u>Date Due</u>
L0006869-0001	C0123806	GAS	OVS Tubes	Sample Media Blank T1R0 A	11/22/2005	12/10/2005
L0006869-0002	C0123807	GAS	OVS Tubes	Sample Media Blank T1R0 B	11/22/2005	12/10/2005
L0006869-0003	C0123808	GAS	OVS Tubes	Sample Media Blank T1R0 C	11/22/2005	12/10/2005
L0006869-0004	C0123809	GAS	OVS Tubes	Building 4 office T1R1 A	11/22/2005	12/10/2005
L0006869-0005	C0123810	GAS	OVS Tubes	Building 4 office T1R1 B	11/22/2005	12/10/2005
L0006869-0006	C0123811	GAS	OVS Tubes	Building 4 office T1R1 C	11/22/2005	12/10/2005
L0006869-0007	C0123812	GAS	OVS Tubes	Building 4 mixing T1R2 A	11/22/2005	12/10/2005
L0006869-0008	C0123813	GAS	OVS Tubes	Building 4 mixing T1R2 B	11/22/2005	12/10/2005
L0006869-0009	C0123814	GAS	OVS Tubes	Building 4 mixing T1R2 C	11/22/2005	12/10/2005
L0006869-0010	C0123815	GAS	OVS Tubes	Building 4 oven T1R3 A	11/22/2005	12/10/2005
L0006869-0011	C0123816	GAS	OVS Tubes	Building 4 oven T1R3 B	11/22/2005	12/10/2005
L0006869-0012	C0123817	GAS	OVS Tubes	Building 4 oven T1R3 C	11/22/2005	12/10/2005
L0006869-0013	C0123818	GAS	OVS Tubes	Building 5 oven T1R4 A	11/22/2005	12/10/2005
L0006869-0014	C0123819	GAS	OVS Tubes	Building 5 oven T1R4 B	11/22/2005	12/10/2005
L0006869-0015	C0123820	GAS	OVS Tubes	Building 5 oven T1R4 C	11/22/2005	12/10/2005
L0006869-0016	C0123821	GAS	OVS Tubes	Building 6 oven T1R5 A	11/22/2005	12/10/2005
L0006869-0017	C0123822	GAS	OVS Tubes	Building 6 oven T1R5 B	11/22/2005	12/10/2005
L0006869-0018	C0123823	GAS	OVS Tubes	Building 6 oven T1R5 C	11/22/2005	12/10/2005
L0006869-0019	C0123824	GAS	OVS Tubes	Control 1 A		12/10/2005
L0006869-0020	C0123825	GAS	OVS Tubes	Control 1 B		12/10/2005
L0006869-0021	C0123826	GAS	OVS Tubes	Control 1 C		12/10/2005

Login

Login Reviewed By: Bum S M CWA

Date/Time: 12/5/05 1540



3058 Research Drive Phone: 814-272-1039
State College, PA 16801 Fax: 814-231-1580

TEMPORARY SAMPLE STORAGE FORM

To be completed during ExyLIMS Login

Project #: P1903

Login #: LC869

Initials / Date: mb 11/30/06

One form to be completed for each package

Date / Time Received: 11/29/06 10:00

Received By: Mark Amore

Shipper: FedEx

Shipper Package ID: 453292604227

Temperature (deg C) / Thermometer ID: 4.8 D0001775

mb 11/30/06

Temperature Control Method: D0005779 Blowse

Temporary Storage Location: D0000539

Condition of sample(s):

- ☒ Good – Package and contents uncompromised
☐ Fair – Package damaged / contents uncompromised
☐ Poor – Package and contents compromised

Notes:

ORIGIN ID: BBBA (612) 832-2600
BARR ENGINEERING COMPANY
BARR ENGINEERING COMPANY
4700 WEST 77TH STREET
SUITE 200
EDINA, MN 554354803
UNITED STATES US

Ship Date: 28NOV05
Actual Wgt: 3.7 LB
System#: 0081929/CAFE2285
Account: S 055429979

TO KAREN RISHA--SAMPLE RECEIVING

(814) 231-8032

EXYGEN RESEARCH
3048 RESEARCH DRIVE

FedEx
Express

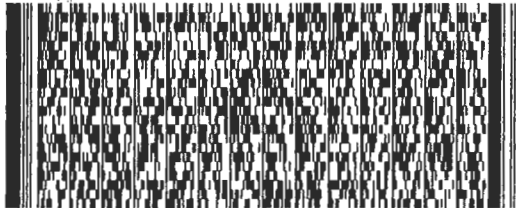
STATE COLLEGE, PA 16801



REF: 3201002001002THRLTS



Delivery Address
Barcode



BILL SENDER

PRIORITY OVERNIGHT

TUE

Deliver By:
29NOV05

TRK# 4532 9210 4227

Form
0201

PIT AA

: 16801 -PA-US
DSR

NV SCEA



Part # 156148 40: NMT P 20

blue ice 4.8

TAC EPA 04666

RAW DATA REPORT

Sponsor Study No:	NA	Limit of Quantitation:	0.1 ng/mL	Set No:	120205B
Oxygen Study No:	L6869	Injection Volume:	15 µL	Analyst:	Chrissy Edwards
Analyte:	APFO	Matrix:	OVS Tubes	Instrument Type:	LC/MS/MS Unit # 6
Ions Monitored:	413 -> 369	Sample Volume Extracted:	NA	Extraction Date:	12/02/05
Site:	NA	Final Volume:	1.0 mL	Analyzed on:	12/17/05

Oxygen ID	Sponsor ID	Sample Code	Run No.	Std. Conc. (ng/mL)	Dilution Factor	Peak Area	PFOA Found (ng/mL)	PFOA Found (ng/fraction)	APFO Found (ng/fraction)	Amount PFOA Added (ng/mL)	Recovery (%)
C120205-8	-	CS	120205B-101	0.05	-	6850	-	-	-	-	-
C120205-7	-	CS	120205B-102	0.1	-	9763	-	-	-	-	-
C120205-6	-	CS	120205B-103	0.2	-	19864	-	-	-	-	-
C120205-5	-	CS	120205B-104	0.5	-	56506	-	-	-	-	-
C120205-4	-	CS	120205B-105	1.0	-	84296	-	-	-	-	-
C120205-3	-	CS	120205B-106	5.0	-	324180	-	-	-	-	-
C120205-2	-	CS	120205B-107	10.0	-	612627	-	-	-	-	-
C120205-1	-	CS	120205B-108	50.0	-	2604609	-	-	-	-	-
Methanol Wash	-	C	120205B-109	-	-	2631	-	-	-	-	-
L6869-1 Blank	Sample Media Blank T1R0 A	C	120205B-110	-	1	2579	ND	ND	ND	-	-
L6869-2 Blank	Sample Media Blank T1R0 B	C	120205B-111	-	1	2836	ND	ND	ND	-	-
L6869-3 Blank	Sample Media Blank T1R0 C	C	120205B-112	-	1	1850	ND	ND	ND	-	-
L6869-19 Blank Spk	Control 1 A	LCS	120205B-113	-	1	103451	1.81	1.81	1.88	2.0	91
L6869-20 Blank Spk	Control 1 B	LCS	120205B-114	-	1	6265	ND	ND	ND	-	-
L6869-21 Blank Spk	Control 1 C	LCS	120205B-115	-	1	2492	ND	ND	ND	-	-
C120205-8	-	CS	120205B-116	0.05	-	6456	-	-	-	-	-
C120205-7	-	CS	120205B-117	0.1	-	10733	-	-	-	-	-
L6869-4	Building 4 office T1R1 A	S	120205B-118	-	1	2384639	44.6	44.6	46.4	-	-
L6869-5	Building 4 office T1R1 B	S	120205B-119	-	1	146376	2.61	2.61	2.72	-	-
L6869-6	Building 4 office T1R1 C	S	120205B-120	-	1	74092	1.26	1.26	1.31	-	-
L6869-7	Building 4 mixing T1R2 A	S	120205B-121	-	10	2322318	434	434	452	-	-
L6869-7	Building 4 mixing T1R2 A	S	120205B-122	-	1	16821050	*	-	-	-	-
L6869-8	Building 4 mixing T1R2 B	S	120205B-123	-	1	315051	5.77	5.77	6.01	-	-
L6869-9	Building 4 mixing T1R2 C	S	120205B-124	-	1	85547	1.47	1.47	1.53	-	-
C120205-6	-	CS	120205B-125	0.2	-	18159	-	-	-	-	-
C120205-5	-	CS	120205B-126	0.5	-	54222	-	-	-	-	-
L6869-10	Building 4 oven T1R3 A	S	120205B-127	-	100	710837	1320	1320	1374	-	-
L6869-10	Building 4 oven T1R3 A	S	120205B-128	-	1	34356384	*	-	-	-	-
L6869-11	Building 4 oven T1R3 B	S	120205B-129	-	1	544090	10.1	10.1	10.5	-	-
L6869-12	Building 4 oven T1R3 C	S	120205B-130	-	1	119943	2.12	2.12	2.21	-	-
L6869-13	Building 5 oven T1R4 A	S	120205B-131	-	100	1339684	2500	2500	2603	-	-
L6869-13	Building 5 oven T1R4 A	S	120205B-132	-	1	49394532	*	-	-	-	-
L6869-14	Building 5 oven T1R4 B	S	120205B-133	-	1	1563750	29.2	29.2	30.4	-	-
L6869-15	Building 5 oven T1R4 C	S	120205B-134	-	1	207540	3.76	3.76	3.91	-	-
Methanol Wash	-	C	120205B-135	-	-	2549	-	-	-	-	-
C120205-4	-	CS	120205B-136	1.0	-	75278	-	-	-	-	-
C120205-3	-	CS	120205B-137	5.0	-	319383	-	-	-	-	-
L6869-16	Building 6 oven T1R5 A	S	120205B-138	-	100	32292	47.4	47.4	49.3	-	-
L6869-16	Building 6 oven T1R5 A	S	120205B-139	-	1	2680607	*	-	-	-	-
L6869-17	Building 6 oven T1R5 B	S	120205B-140	-	1	489932	9.05	9.05	9.42	-	-
L6869-18	Building 6 oven T1R5 C	S	120205B-141	-	1	138052	2.46	2.46	2.56	-	-
C120205-2	-	CS	120205B-142	10.0	-	555354	-	-	-	-	-
C120205-1	-	CS	120205B-143	50.0	-	2488549	-	-	-	-	-

PFOA Found (ng/mL) = (peak area - intercept) / slope x DF

Standard Curve : Linear (1/x weighted)

Recovery (%) = $\frac{[\text{PFOA found (ng/mL)} - \text{PFOA found in control (ng/mL)}]}{\text{amount PFOA added (ng/mL)}} \times 100$

Intercept = 6990.56

Slope = 53365.6

Coef. Of Det. = 0.995131

PFOA Found (ng/fraction) = (PFOA Found (ng/mL) x 1 mL)

APFO Found (ng/fraction) = PFOA found (ng/fraction) x (MW APFO (431) / MW PFOA (414))

CS = Calibration standard

LF = Lab fortified sample

ND = Not detected = Response between 0 and 0.05 ng/mL

C = Control sample

LCS = Laboratory Control Spike

NQ = Not quantifiable = Response between 0.05 and 0.1 ng/mL

S = Sample

*Sample was analyzed at several dilution levels in this set. The appropriate result is reported.

Spreadsheet prepared by: CEE 12/22/05

RAW DATA REPORT

Sponsor Study No:	NA	Limit of Quantitation:	0.1 ng/mL	Set No:	120205B
Oxygen Study No:	L6869	Injection Volume:	15 µL	Analyst:	Chrissy Edwards
Analyte:	¹³ C-PFOA	Matrix:	OVS Tubes	Instrument Type:	LC/MS/MS Unit # 6
Ions Monitored:	415 -> 370	Sample Volume Extracted:	NA	Extraction Date:	12/02/05
Site:	NA	Final Volume:	1.0 mL	Analyzed on:	12/17/05

Oxygen ID	Sponsor ID	Sample Code	Run No.	Std. Conc. (ng/mL)	Dilution Factor	Peak Area	Amount		
							13C-PFOA Found (ng/mL)	13C-PFOA Added (ng/mL)	Recovery (%)
C120205-8	-	CS	120205B-101	0.05	-	4538	-	-	-
C120205-7	-	CS	120205B-102	0.1	-	7649	-	-	-
C120205-6	-	CS	120205B-103	0.2	-	16228	-	-	-
C120205-5	-	CS	120205B-104	0.5	-	48920	-	-	-
C120205-4	-	CS	120205B-105	1.0	-	69840	-	-	-
C120205-3	-	CS	120205B-106	5.0	-	293826	-	-	-
C120205-2	-	CS	120205B-107	10.0	-	519815	-	-	-
C120205-1	-	CS	120205B-108	50.0	-	2362054	-	-	-
Methanol Wash	-	C	120205B-109	-	-	0	-	-	-
L6869-1 Blank	Sample Media Blank T1R0 A	C	120205B-110	-	1	50054	0.948	1.0	95
L6869-2 Blank	Sample Media Blank T1R0 B	C	120205B-111	-	1	1018	ND	-	-
L6869-3 Blank	Sample Media Blank T1R0 C	C	120205B-112	-	1	0	ND	-	-
L6869-19 Blank Spk	Control 1 A	LCS	120205B-113	-	1	46675	0.877	1.0	88
L6869-20 Blank Spk	Control 1 B	LCS	120205B-114	-	1	265	ND	-	-
L6869-21 Blank Spk	Control 1 C	LCS	120205B-115	-	1	0	ND	-	-
C120205-8	-	CS	120205B-116	0.05	-	4573	-	-	-
C120205-7	-	CS	120205B-117	0.1	-	7800	-	-	-
L6869-4	Building 4 office T1R1 A	S	120205B-118	-	1	47574	0.896	1.0	90
L6869-5	Building 4 office T1R1 B	S	120205B-119	-	1	663	ND	-	-
L6869-6	Building 4 office T1R1 C	S	120205B-120	-	1	272	ND	-	-
L6869-7	Building 4 mixing T1R2 A	S	120205B-121	-	10	6750	*	1.0	-
L6869-7	Building 4 mixing T1R2 A	S	120205B-122	-	1	48873	0.923	1.0	92
L6869-8	Building 4 mixing T1R2 B	S	120205B-123	-	1	1046	ND	-	-
L6869-9	Building 4 mixing T1R2 C	S	120205B-124	-	1	209	ND	-	-
C120205-6	-	CS	120205B-125	0.2	-	14355	-	-	-
C120205-5	-	CS	120205B-126	0.5	-	46496	-	-	-
L6869-10	Building 4 oven T1R3 A	S	120205B-127	-	100	1246	*	1.0	-
L6869-10	Building 4 oven T1R3 A	S	120205B-128	-	1	66853	1.30	1.0	130
L6869-11	Building 4 oven T1R3 B	S	120205B-129	-	1	1047	ND	-	-
L6869-12	Building 4 oven T1R3 C	S	120205B-130	-	1	324	ND	-	-
L6869-13	Building 5 oven T1R4 A	S	120205B-131	-	100	1771	*	1.0	-
L6869-13	Building 5 oven T1R4 A	S	120205B-132	-	1	85820	1.69	1.0	169
L6869-14	Building 5 oven T1R4 B	S	120205B-133	-	1	1923	ND	-	-
L6869-15	Building 5 oven T1R4 C	S	120205B-134	-	1	457	ND	-	-
Methanol Wash	-	C	120205B-135	-	-	95	-	-	-
C120205-4	-	CS	120205B-136	1.0	-	64264	-	-	-
C120205-3	-	CS	120205B-137	5.0	-	284574	-	-	-
L6869-16	Building 6 oven T1R5 A	S	120205B-138	-	100	525	*	1.0	-
L6869-16	Building 6 oven T1R5 A	S	120205B-139	-	1	44847	0.839	1.0	84
L6869-17	Building 6 oven T1R5 B	S	120205B-140	-	1	567	ND	-	-
L6869-18	Building 6 oven T1R5 C	S	120205B-141	-	1	173	ND	-	-
C120205-2	-	CS	120205B-142	10.0	-	471436	-	-	-
C120205-1	-	CS	120205B-143	50.0	-	2265808	-	-	-

13C-PFOA Found (ng/mL) = (peak area - intercept) / slope x DF
Recovery (%) = $\frac{13C-PFOA \text{ found (ng/mL)}}{\text{amount 13C-PFOA added (ng/mL)}} \times 100$

Standard Curve : Linear (1/x weighted)
Intercept = 4633.04
Slope = 47928.5
Coef. Of Det. = 0.996972

CS = Calibration standard
C = Control sample
S = Sample

LF = Lab fortified sample
LCS = Laboratory Control Spike

ND = Not detected = Response between 0 and 0.05 ng/mL
NQ = Not quantifiable = Response between 0.05 and 0.1 ng/mL

*Sample was analyzed at several dilution levels in this set. The appropriate result is reported.

Spreadsheet prepared by: CEE 12/21/05



3058 Research Drive
State College, PA 16801

Phone: 814-272-1039
Fax: 814-231-1580

Internal Chain of Custody/Fortification Sheet

Exygen Study Number: L6869

Matrix: Air Tubes

Sponsor Study/Protocol No: NA

The samples listed below were removed from refrigerator No.

Time

Date

Initials

CLIENT SAMPLE ID	EXYGEN ID NUMBER	FORTIFICATION (ng)
Sample Media Blank T1R0 A	L6869-1	1.0
Sample Media Blank T1R0 B	L6869-2	-
Sample Media Blank T1R0 C	L6869-3	-
Control 1 A	L6869-19	2.0
Control 1 B	L6869-20	-
Control 1 C	L6869-21	-
Building 4 office T1R1 A	L6869-4	1.0
Building 4 office T1R1 B	L6869-5	-
Building 4 office T1R1 C	L6869-6	-
Building 4 mixing T1R2 A	L6869-7	1.0
Building 4 mixing T1R2 B	L6869-8	-
Building 4 mixing T1R2 C	L6869-9	-
Building 4 oven T1R3 A	L6869-10	1.0
Building 4 oven T1R3 B	L6869-11	-
Building 4 oven T1R3 C	L6869-12	-
Building 5 oven T1R4 A	L6869-13	1.0
Building 5 oven T1R4 B	L6869-14	-
Building 5 oven T1R4 C	L6869-15	-
Building 6 oven T1R5 A	L6869-16	1.0
Building 6 oven T1R5 B	L6869-17	-
Building 6 oven T1R5 C	L6869-18	-
-	-	-
-	-	-
-	-	-

	Spiking Solution Used	Volume Used for Spiking	Initials/Date
L6869-19	SS0010977 (100 ng/mL PFOA)	20 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-19	SS0010991 (100 ng/mL 13CPFOA)	20 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-1	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-4	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-7	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-10	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-13	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
L6869-16	SS0010991 (100 ng/mL 13CPFOA)	10 µL (10-20 µL micropipet)	BAK 12/02/05
-	-	-	-

Comments: The entire OVS tube is used for the extraction.

Analysis Summary:

Data Set: 120205B

Data Set:

Data Set:

Initials/Date: CEE 12/16/05

Initials/Date:

Initials/Date:

Set extraction/analysis data verified by: gmf

Date: 12/22/05

March 19, 2004/0

TAC EPA 04669



Phone: 814-272-1039
Fax: 814-231-1580

3058 Research Drive
State College, PA 16801

SAMPLE EXTRACTION AND ANALYSIS TRACKING SHEET

EXYGEN STUDY NUMBER: L6862

METHOD: ExM-079-007B^{SS}

PROTOCOL NUMBER: NA

MATRIX: Air Tubes

ANALYTES: PFOA and ¹³C-PFOA

Client ID	Exygen ID	STEP 1	STEP 2	STEP 3	Dilutions (mL/mL)	STEP 4	Dilutions (mL/mL)	STEP 5	Reagents/ Materials	Lot # or Exygen ID
Sample Media Blank TIR0 A	L6869-1				—		—	—	Methanol	45294
Sample Media Blank TIR0 B	L6869-2				—		—	—	0.2 µm Filters	A1042234
Sample Media Blank TIR0 C	L6869-3				—		—	—	—	—
Control 1 A	L6869-19				—		—	—	—	—
Control 1 B	L6869-20				—		—	—	—	—
Control 1 C	L6869-21				—		—	—	—	—
Building 4 office TIR1 A	L6869-4				—		—	—	—	—
Building 4 office TIR1 B	L6869-5				—		—	—	—	—
Building 4 office TIR1 C	L6869-6				—		—	—	—	—
Building 4 mixing TIR2 A	L6869-7				0.1/1.0		—	—	Initials/Date	BAK 12/02/05
Building 4 mixing TIR2 B	L6869-8				—		—	—	—	—
Building 4 mixing TIR2 C	L6869-9				—		—	—	—	—
Building 4 oven TIR3 A	L6869-10				0.1/1.0		—	—	—	—
Building 4 oven TIR3 B	L6869-11				—		—	—	—	—
Building 4 oven TIR3 C	L6869-12				—		—	—	—	—
Building 5 oven TIR4 A	L6869-13				0.1/1.0		—	—	HPLC	—
Building 5 oven TIR4 B	L6869-14				—		—	—	Methanol	45227
Building 5 oven TIR4 C	L6869-15				—		—	—	Ammonium Acetate	BOTH12
Building 6 oven TIR5 A	L6869-16				0.1/1.0		—	—	HPLC Water	45256
Building 6 oven TIR5 B	L6869-17				—		—	—	—	—
Building 6 oven TIR5 C	L6869-18				—		—	—	—	—
-	-				—		—	—	—	—
-	-				—		—	—	—	—
-	-				—		—	—	—	—
**Initials/Date	-	BAK 12/02/05	BAK 12/02/05	BAK 12/02/05	CEE 12/16/05	CEE 12/16/05	—	—	Initials/Date	CEE 12/16/05

STEP 1: Disassemble the airtube into Fractions A, B and C.

STEP 2: Add 1 mL of methanol and mix 3 times for ~30 seconds with ~10 minutes between mixing.

STEP 3: Filter through a 0.2 µm filter into an autosampler vial.

STEP 4: LC/MS/MS analysis

STEP 5: LC/MS/MS reanalysis.

**Initials and date under each step indicates the personnel that performed this step.

\$\$ Method of Analysis for the Determination of Ammonium Perfluorooctanoate (APFO) in OVS Airbutes by LC/MS/MS for SPI Processors Mass Balance Study.

COMMENTS:

July 19, 2001/4

Masslynx - Sample List

Page 1

Sample List: C:\MASSLYNX\FI\fluorochemicals.PRO\SampleDB\120205B OVS Tubes.SPL
 Printed: Fri Dec 16 16:02:15 2005

Page Position: (1, 1)

CEE 12/16/05

Vial	File Name	LIMS ID	Client ID	Sample Description	Matrix	Sample Type	Conc (ng/mL)	Conc B	Conc C	Test ID	DF
1	41	120205B-101	---	C120205-8, 0.05 ng/mL standard	---	Standard	0.05	---	---	0	1
2	42	120205B-102	---	C120205-7, 0.1 ng/mL standard	---	Standard	0.1	---	---	0	1
3	43	120205B-103	---	C120205-6, 0.2 ng/mL standard	---	Standard	0.2	---	---	0	1
4	44	120205B-104	---	C120205-5, 0.5 ng/mL standard	---	Standard	0.5	---	---	0	1
5	45	120205B-105	---	C120205-4, 1.0 ng/mL standard	---	Standard	1.0	---	---	0	1
6	46	120205B-106	---	C120205-3, 5.0 ng/mL standard	---	Standard	5.0	---	---	0	1
7	47	120205B-107	---	C120205-2, 10 ng/mL standard	---	Standard	10	---	---	0	1
8	48	120205B-108	---	C120205-1, 50 ng/mL standard	---	Standard	50	---	---	0	1
9	92	120205B-109	---	Methanol Wash	---	Blank	---	---	---	0	1
10	11	120205B-110	---	L6869-1 Blank Fraction A	---	Blank	---	---	---	0	1
11	12	120205B-111	---	L6869-2 Blank Fraction B	---	Blank	---	---	---	0	1
12	13	120205B-112	---	L6869-3 Blank Fraction C	---	Blank	---	---	---	0	1
13	14	120205B-113	---	L6869-19 Blank Spk Fraction A, 2.0 ng	---	QC	2.0	2	---	0	1
14	15	120205B-114	---	L6869-20 Blank Spk Fraction B, 2.0 ng	---	QC	2.0	2	---	0	1
15	16	120205B-115	---	L6869-21 Blank Spk Fraction C, 2.0 ng	---	QC	2.0	2	---	0	1
16	41	120205B-116	---	C120205-8, 0.05 ng/mL standard	---	Standard	0.05	---	---	0	1
17	42	120205B-117	---	C120205-7, 0.1 ng/mL standard	---	Standard	0.1	---	---	0	1
18	17	120205B-118	---	L6869-4	---	Analyte	---	1	---	0	1
19	18	120205B-119	---	L6869-5	---	Analyte	---	---	---	0	1
20	19	120205B-120	---	L6869-6	---	Analyte	---	---	---	0	1
21	20	120205B-121	---	L6869-7, DF=10	---	Analyte	---	---	---	0	10
22	21	120205B-122	---	L6869-7	---	Analyte	---	---	---	0	1
23	22	120205B-123	---	L6869-8	---	Analyte	---	1	---	0	1
24	23	120205B-124	---	L6869-9	---	Analyte	---	---	---	0	1
25	43	120205B-125	---	C120205-6, 0.2 ng/mL standard	---	Standard	0.2	---	---	0	1
26	44	120205B-126	---	C120205-5, 0.5 ng/mL standard	---	Standard	0.5	---	---	0	1
27	24	120205B-127	---	L6869-10, DF=100	---	Analyte	---	1	---	0	100
28	25	120205B-128	---	L6869-10	---	Analyte	---	1	---	0	1
29	26	120205B-129	---	L6869-11	---	Analyte	---	---	---	0	1
30	27	120205B-130	---	L6869-12	---	Analyte	---	---	---	0	1
31	28	120205B-131	---	L6869-13, DF=100	---	Analyte	---	1	---	0	100
32	29	120205B-132	---	L6869-13	---	Analyte	---	1	---	0	1
33	30	120205B-133	---	L6869-14	---	Analyte	---	---	---	0	1
34	31	120205B-134	---	L6869-15	---	Analyte	---	---	---	0	1
35	92	120205B-135	---	Methanol Wash	---	Blank	---	---	---	0	1
36	45	120205B-136	---	C120205-4, 1.0 ng/mL standard	---	Standard	1.0	---	---	0	1
37	46	120205B-137	---	C120205-3, 5.0 ng/mL standard	---	Standard	5.0	---	---	0	1
38	32	120205B-138	---	L6869-16, DF=100	---	Analyte	---	1	---	0	100
39	33	120205B-139	---	L6869-16	---	Analyte	---	1	---	0	1
40	34	120205B-140	---	L6869-17	---	Analyte	---	---	---	0	1
41	35	120205B-141	---	L6869-18	---	Analyte	---	---	---	0	1
42	47	120205B-142	---	C120205-2, 10 ng/mL standard	---	Standard	10	---	---	0	1
43	48	120205B-143	---	C120205-1, 50 ng/mL standard	---	Standard	50	---	---	0	1

Sample List: C:\MASSLYNX\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes.SPL
Printed: Fri Dec 16 16:02:15 2005

Page Position: (2, 1)

CEE 12/16/05

	MS Method	HPLC Method	MS Tune File	Inj. Volume
1	PFOA 13CPFOA	water	Fluorochems	15
2	PFOA 13CPFOA	water	Fluorochems	15
3	PFOA 13CPFOA	water	Fluorochems	15
4	PFOA 13CPFOA	water	Fluorochems	15
5	PFOA 13CPFOA	water	Fluorochems	15
6	PFOA 13CPFOA	water	Fluorochems	15
7	PFOA 13CPFOA	water	Fluorochems	15
8	PFOA 13CPFOA	water	Fluorochems	15
9	PFOA 13CPFOA	water	Fluorochems	15
10	PFOA 13CPFOA	water	Fluorochems	15
11	PFOA 13CPFOA	water	Fluorochems	15
12	PFOA 13CPFOA	water	Fluorochems	15
13	PFOA 13CPFOA	water	Fluorochems	15
14	PFOA 13CPFOA	water	Fluorochems	15
15	PFOA 13CPFOA	water	Fluorochems	15
16	PFOA 13CPFOA	water	Fluorochems	15
17	PFOA 13CPFOA	water	Fluorochems	15
18	PFOA 13CPFOA	water	Fluorochems	15
19	PFOA 13CPFOA	water	Fluorochems	15
20	PFOA 13CPFOA	water	Fluorochems	15
21	PFOA 13CPFOA	water	Fluorochems	15
22	PFOA 13CPFOA	water	Fluorochems	15
23	PFOA 13CPFOA	water	Fluorochems	15
24	PFOA 13CPFOA	water	Fluorochems	15
25	PFOA 13CPFOA	water	Fluorochems	15
26	PFOA 13CPFOA	water	Fluorochems	15
27	PFOA 13CPFOA	water	Fluorochems	15
28	PFOA 13CPFOA	water	Fluorochems	15
29	PFOA 13CPFOA	water	Fluorochems	15
30	PFOA 13CPFOA	water	Fluorochems	15
31	PFOA 13CPFOA	water	Fluorochems	15
32	PFOA 13CPFOA	water	Fluorochems	15
33	PFOA 13CPFOA	water	Fluorochems	15
34	PFOA 13CPFOA	water	Fluorochems	15
35	PFOA 13CPFOA	water	Fluorochems	15
36	PFOA 13CPFOA	water	Fluorochems	15
37	PFOA 13CPFOA	water	Fluorochems	15
38	PFOA 13CPFOA	water	Fluorochems	15
39	PFOA 13CPFOA	water	Fluorochems	15
40	PFOA 13CPFOA	water	Fluorochems	15
41	PFOA 13CPFOA	water	Fluorochems	15
42	PFOA 13CPFOA	water	Fluorochems	15
43	PFOA 13CPFOA	water	Fluorochems	15

LC/MS/MS SYSTEM AND OPERATING CONDITIONS

Sponsor Protocol No: NA

Exygen Study No: L6869

Instrument: Micromass Quattro Ultima (LC/MS/MS Unit #6)

Computer: COMPAQ Professional Workstation AP200

Software: Microsoft Windows NT: Version 4 Build 1381: Service Pack 5
Micromass Limited: MassLynx 3.4 Build 004

HPLC Equipment: Hewlett Packard (HP) Series 1100
HP Quat Pump HP Vacuum Degasser
HP Autosampler HP Column Oven

HPLC Column: Genesis C-8, 5 cm x 2.1 mm i.d. x 4 μ (Exygen ID: MA0021031)
(JONESCHROMATOGRAPHY: Part No. FK5962E)

Mobile Phase (A) : 2 mM Ammonium Acetate in Water
Mobile Phase (B) : Methanol

Analyst: Chrissy Edwards CEE 12/16/05
Exygen Research
3058 Research Drive, State College, PA 16801
Phone: (814) 272-1039 FAX: (814) 231-1580

NOTE: The next 3 pages are computer generated printouts from the masslynx software program. The pages contain the instrument settings used for the analysis of this data set.

All Handwritten Peak ID's by: CEE 12/21/05

Scanning Method Report

Page 1

Method: C:\MASSLYNX\FLUOROCHEMICALS.PRO\ACQUDE\PFOA 13CPFOA

Last Modified: Wed Nov 23 14:39:10 2005

Printed: Fri Dec 16 16:02:32 2005

CEE 12/16/05

Solvent Delay (mins) : 0.00

Analog Channel 4 : Unused

Function : 1 MRM of 2 Mass Pairs (ESP-)

Inter Channel Delay (Secs) : 0.03

Span (Daltons) : 0.00

Start Time (Mins) : 0.00

End Time (Mins) : 8.00

Repeats : 1

	Channel	Parent	Daughter	Dwell (Secs)	Coll Energy (eV)	Cone (V)
1		413.00	369.00	0.20	10	10
2		415.00	370.00	0.20	10	10

Method File: c:\masslynx\fluorochemicals.pro\acqddb\water
Last Modified: Friday, December 16, 2005 15:46:34

Printed: Friday, December 16, 2005 16:02:44

CEE 12/16/05

HP1100 LC Pump Initial Conditions

Solvents

A%	60.0
B%	40.0
C%	0.0
D%	0.0

Flow (ml/min)	0.300
Stop Time (mins)	15.0
Min Pressure (bar)	0
Max Pressure (bar)	400
Oven Temperature Left (°C)	35.0
Oven Temperature Right (°C)	35.0

HP1100 LC Pump Gradient Timetable

The gradient Timetable contains 10 entries which are :

Time	A%	B%	C%	D%	Flow	Pressure
0.00	60.0	40.0	0.0	0.0	0.300	400
0.40	60.0	40.0	0.0	0.0	0.300	400
1.00	10.0	90.0	0.0	0.0	0.300	400
7.00	10.0	90.0	0.0	0.0	0.300	400
7.50	0.0	100.0	0.0	0.0	0.300	400
9.00	0.0	100.0	0.0	0.0	0.400	400
9.50	60.0	40.0	0.0	0.0	0.400	400
13.50	60.0	40.0	0.0	0.0	0.400	400
14.00	60.0	40.0	0.0	0.0	0.300	400
15.00	60.0	40.0	0.0	0.0	0.300	400

HP1100 LC Pump External Event Timetable

The Timetable contains 6 entries which are :

Time	Column Switch	Contact1	Contact2	Contact3	Contact4
Initial	Off	Off	Off	Off	Off
0.00	Off	On	Off	Off	Off
0.05	Off	Off	Off	Off	Off
0.10	Off	Off	On	Off	Off
7.95	Off	Off	Off	On	Off
8.00	Off	Off	Off	Off	Off

HP1100 Autosampler Initial Conditions

Draw Speed	200.0
Eject Speed (μl/min)	200
Draw Position (mm)	0.50
Stop Time (mins)	15.00
Injection Volume (μl)	15.0
Vial Number	93

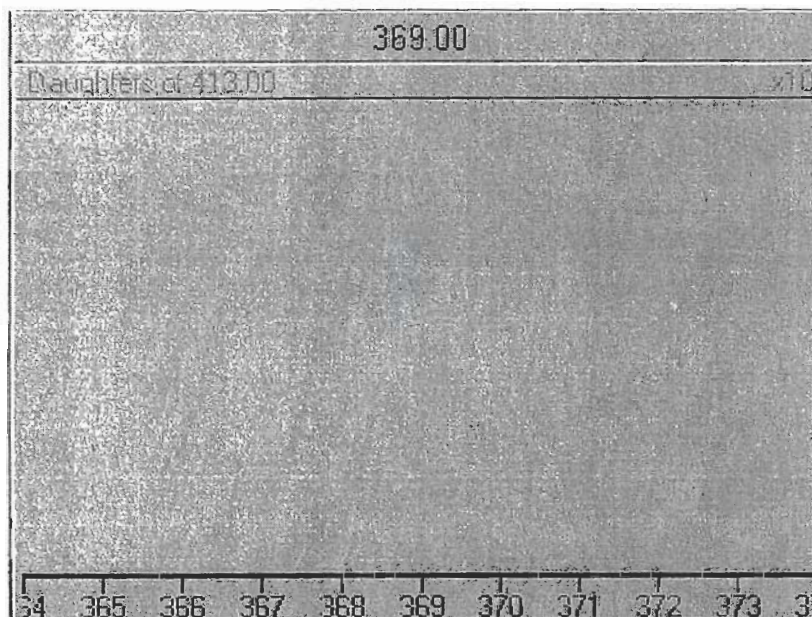
Tuning Method Report

Page 1

Method: C:\MASSLYNX\FLUOROCHEMICALS.PRO\ACQUDB\FLUOROCHEMS

Printed: Fri Dec 16 16:02:57 2005

CEE 12/16/05



Dau 413.00

SOURCE (ESP-)	Set	Rdbk	Analyser	Set	Rdbk
Capillary	3.00	-2.93	LM Res 1	13.5	
Cone	10	-10	HM Res 1	13.5	
Hexapole 1	0.0		IEnergy 1	1.0	
Aperture 1	0.0		Entrance	-2	8
Hexapole 2	0.0		Collision	30	9
Source Block Temp.	100	100	Exit	2	11
Desolvation Temp.	300	299	LM Res 2	13.5	
			HM Res 2	13.5	
			IEnergy 2	2.0	
			Multiplier	650	-648
Pressures	Rdbk		Gas Flows	Rdbk	
Analyser Vacuum	OFF		Cone Gas	188.6	
Gas Cell	3.0e-3		Desolvation	726.4	

Quantify Calibration Report

Page 1

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Calibration: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\CurveDB\120205B OVS Tubes

Last modified: Wed Dec 21 12:45:40 2005

Printed: Wed Dec 21 12:46:00 2005

CEE 12/21/05

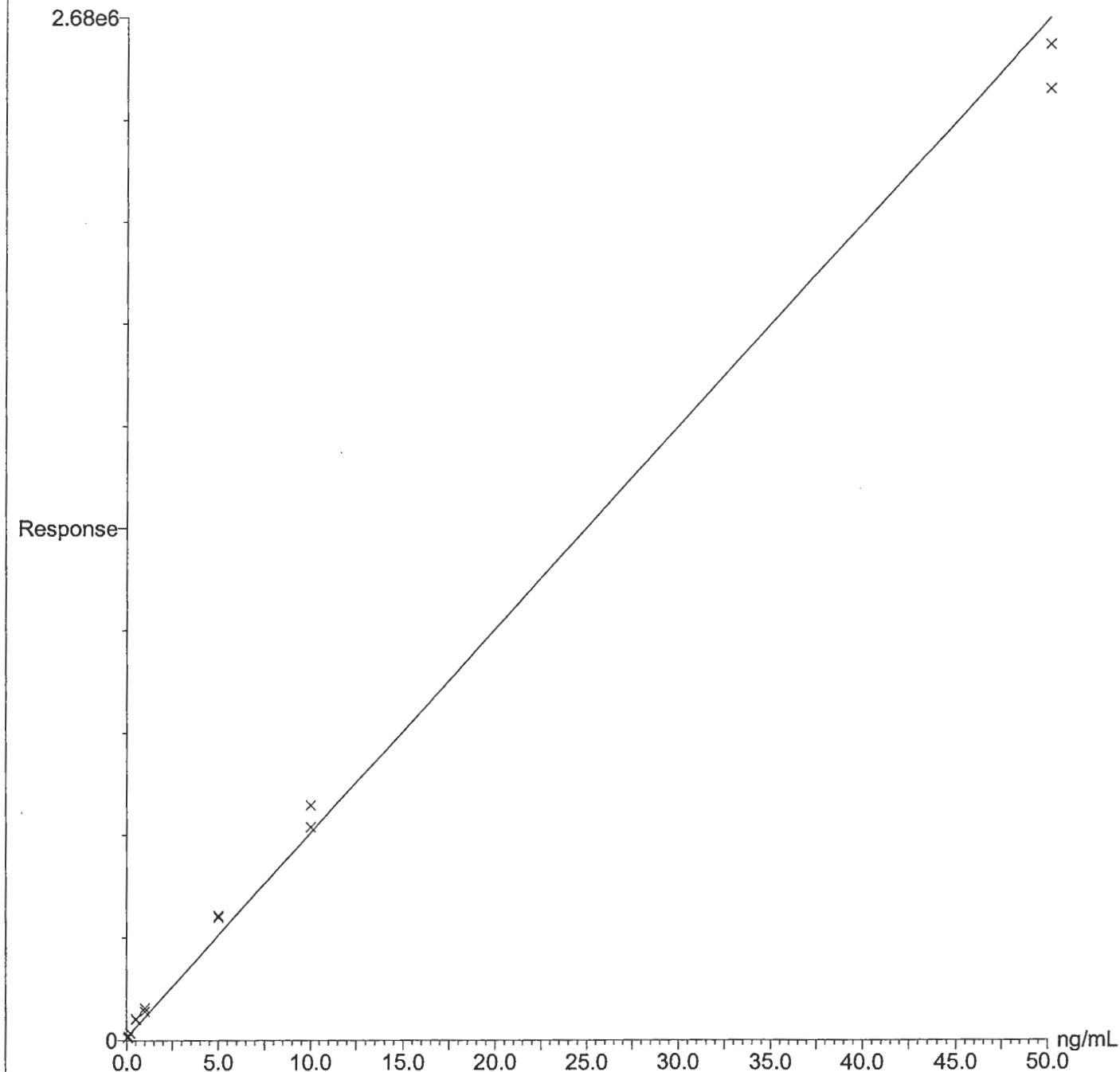
Compound 1 name: C8 Acid (PFOA)

Coefficient of Determination: 0.995131

Calibration curve: $53365.6 * x + 6990.56$

Response type: External Std, Area

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Quantify Calibration Report

Page 2

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Calibration: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\CurveDB\120205B OVS Tubes

Last modified: Wed Dec 21 12:45:40 2005

Printed: Wed Dec 21 12:46:00 2005

CEE 12/21/05

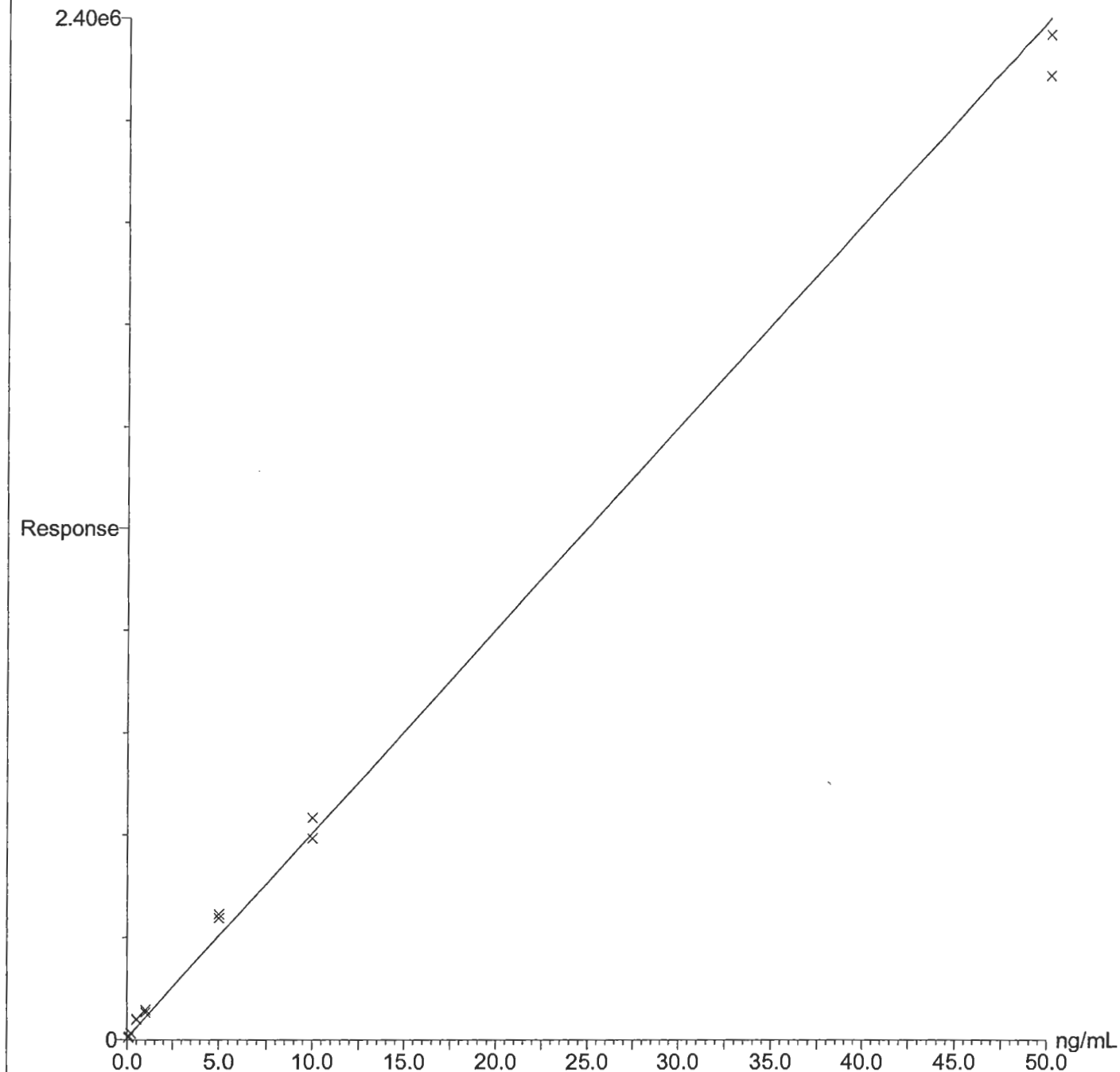
Compound 2 name: 13C PFOA

Coefficient of Determination: 0.996972

Calibration curve: $47928.5 * x + 4633.04$

Response type: External Std, Area

Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Quantify Sample Report

Page 1

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-101

Text:

Initials

CEE

Date

12/21/05

Run #

120205B-101 To 120205B-143

1: C8 Acid (PFOA)

C120205-8, 0.05 ng/mL standard

17-Dec-2005 09:42:15

LC/MS/MS #6

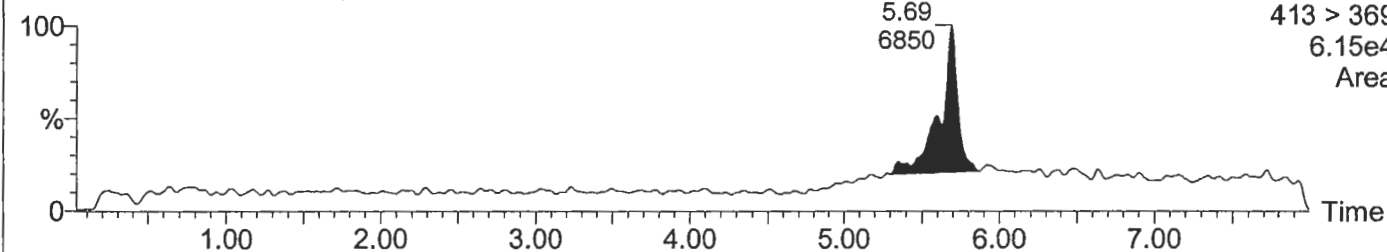
MRM of 2 Channels ES-

413 > 369

6.15e4

Area

120205B-101 Sm (Mn, 2x2)



2: 13C PFOA

C120205-8, 0.05 ng/mL standard

17-Dec-2005 09:42:15

LC/MS/MS #6

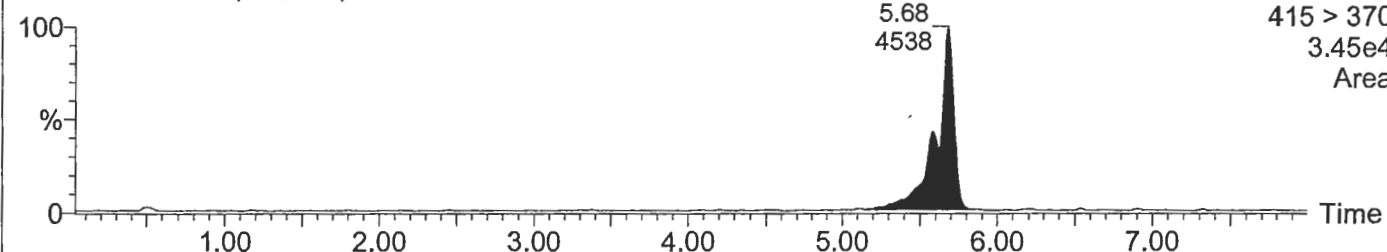
MRM of 2 Channels ES-

415 > 370

3.45e4

Area

120205B-101 Sm (Mn, 2x2)



Quantify Sample Report

Page 2

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

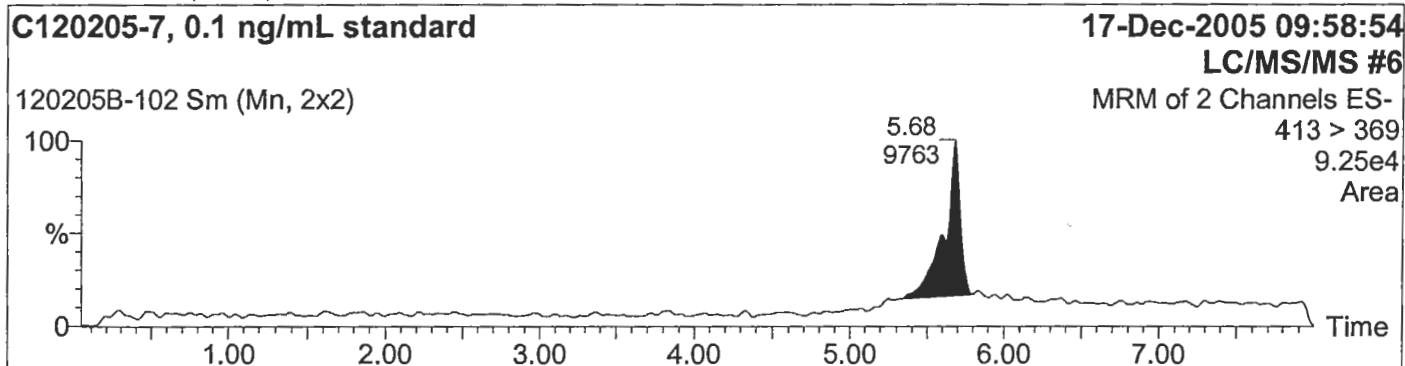
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

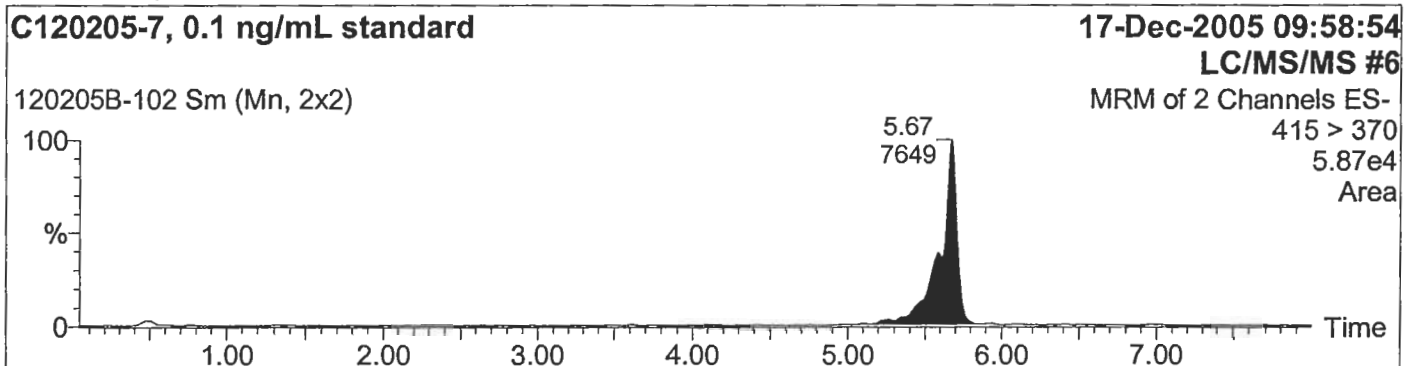
Name: 120205B-102

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 3

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

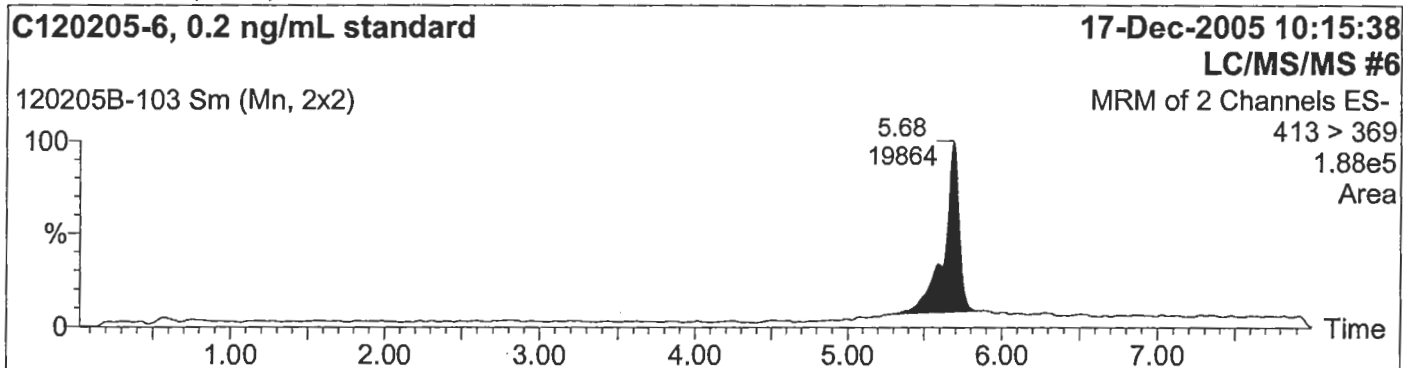
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

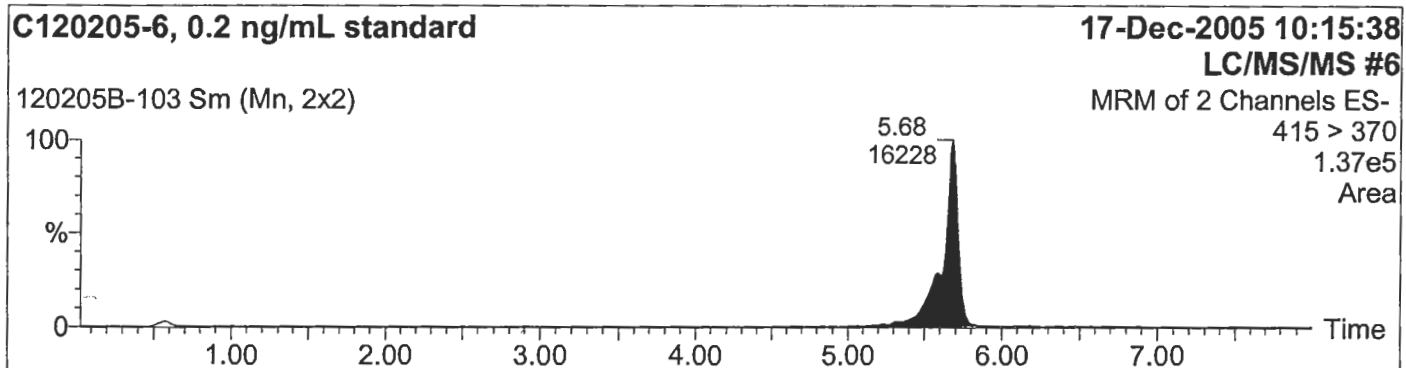
Name: 120205B-103

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 4

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-104

Text:

1: C8 Acid (PFOA)

C120205-5, 0.5 ng/mL standard

17-Dec-2005 10:32:16

LC/MS/MS #6

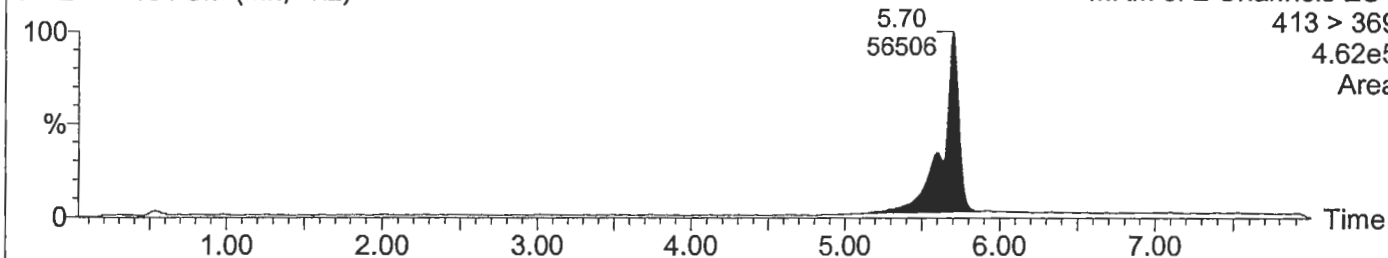
120205B-104 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

4.62e5

Area



2: 13C PFOA

C120205-5, 0.5 ng/mL standard

17-Dec-2005 10:32:16

LC/MS/MS #6

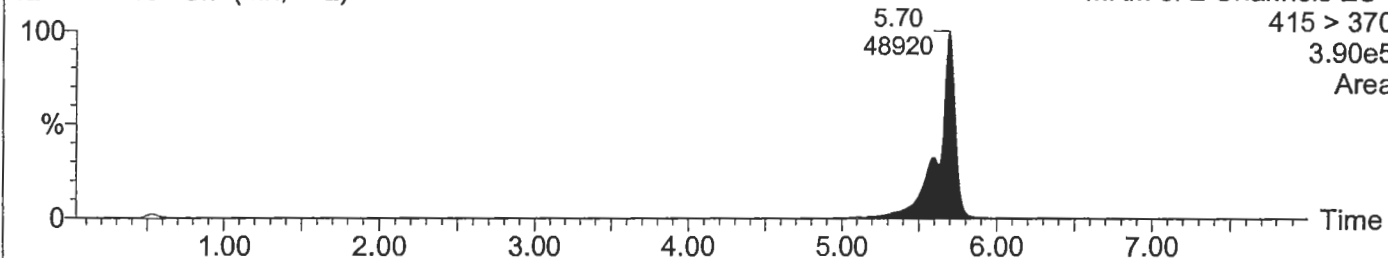
120205B-104 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

3.90e5

Area



Quantify Sample Report

Page 5

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

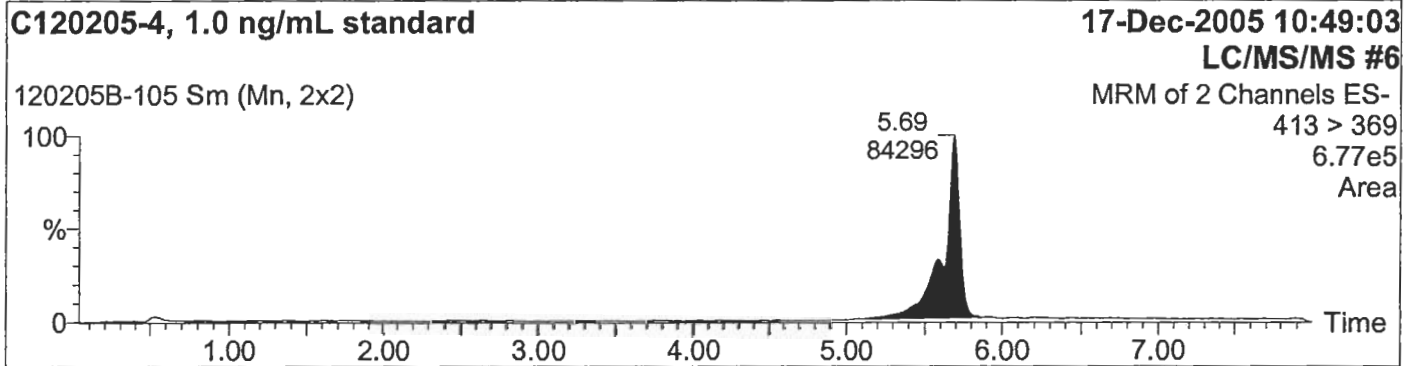
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

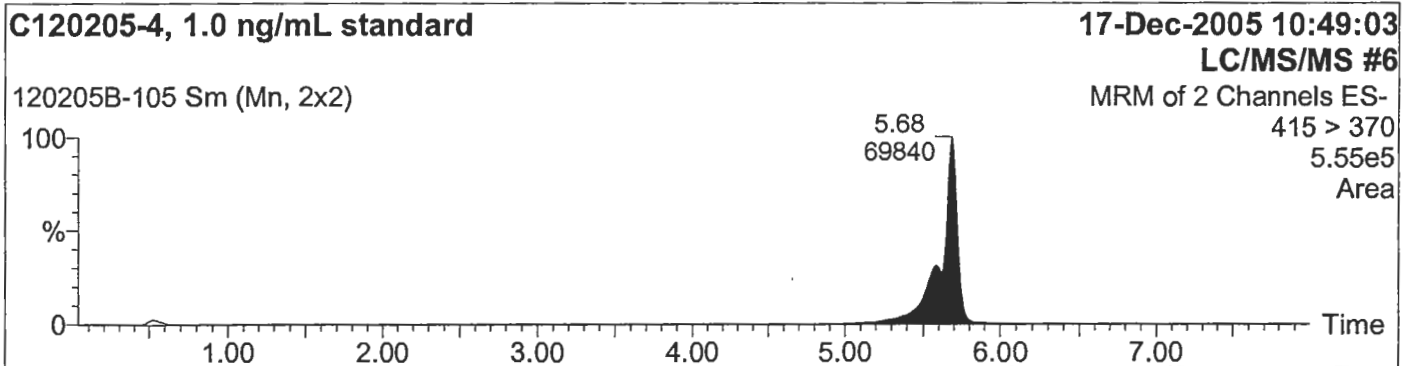
Name: 120205B-105

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 6

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-106

Text:

1: C8 Acid (PFOA)

C120205-3, 5.0 ng/mL standard

17-Dec-2005 11:05:45

LC/MS/MS #6

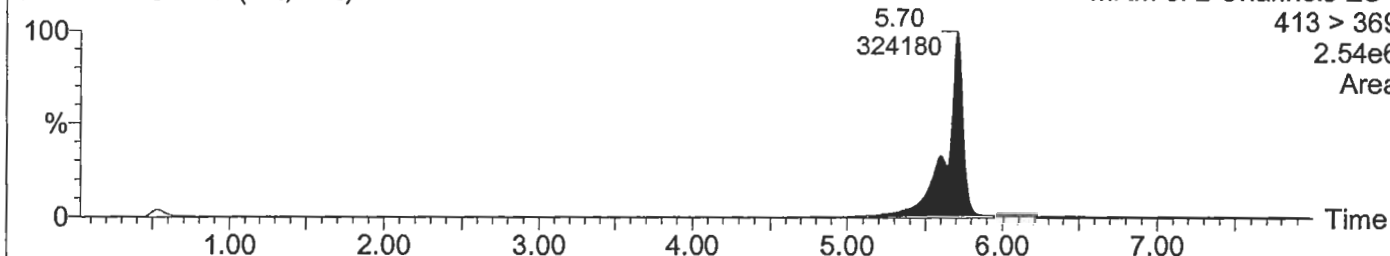
120205B-106 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

2.54e6

Area



2: 13C PFOA

C120205-3, 5.0 ng/mL standard

17-Dec-2005 11:05:45

LC/MS/MS #6

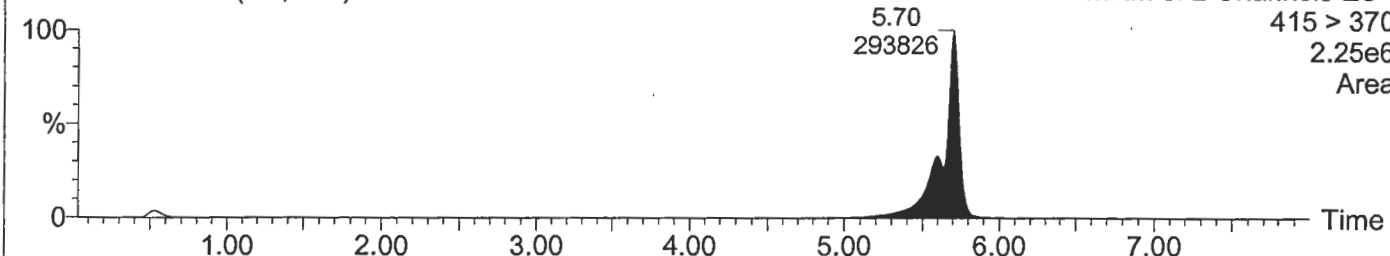
120205B-106 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

2.25e6

Area



Quantify Sample Report

Page 7

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

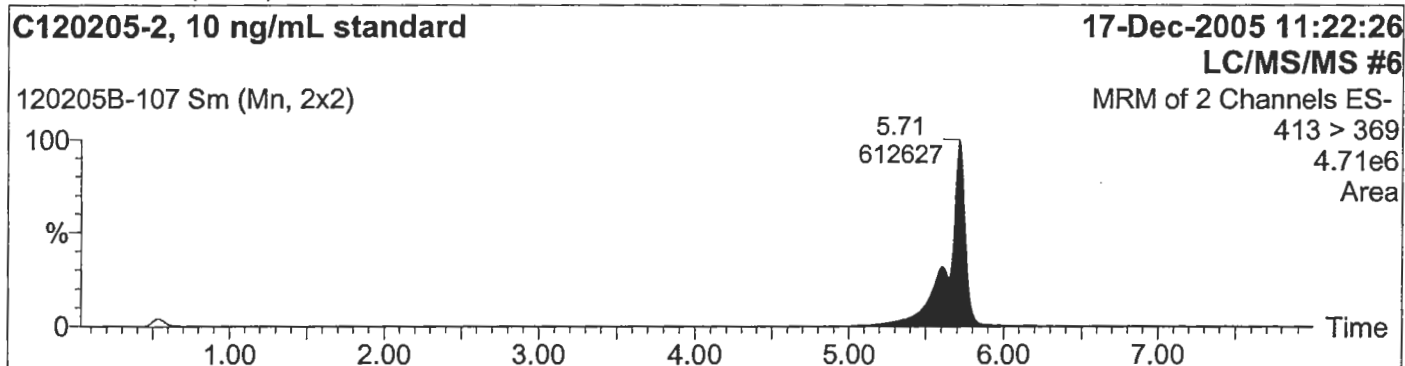
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

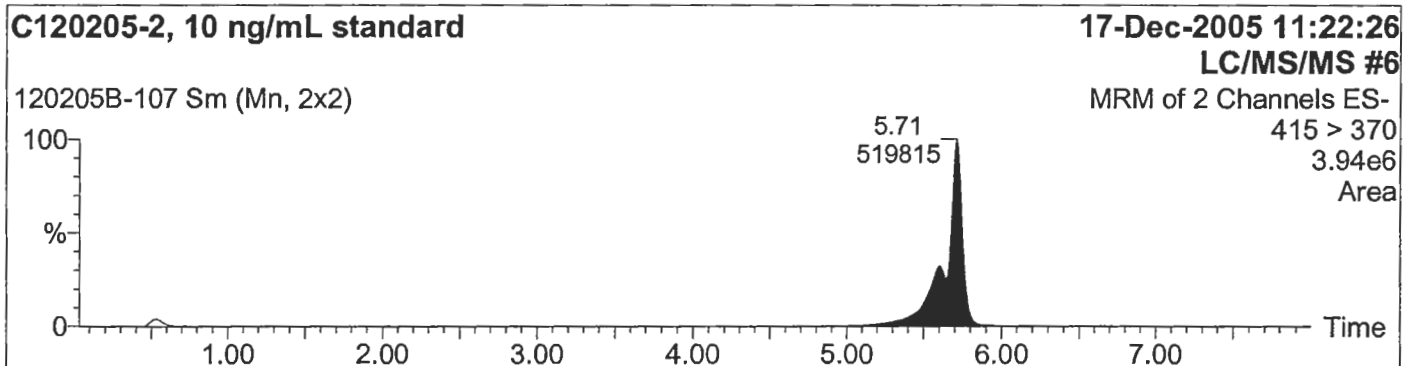
Name: 120205B-107

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.:L6869, Set No.:120205B, Ext.Date:12/02/05, Analyst: C.Edwards

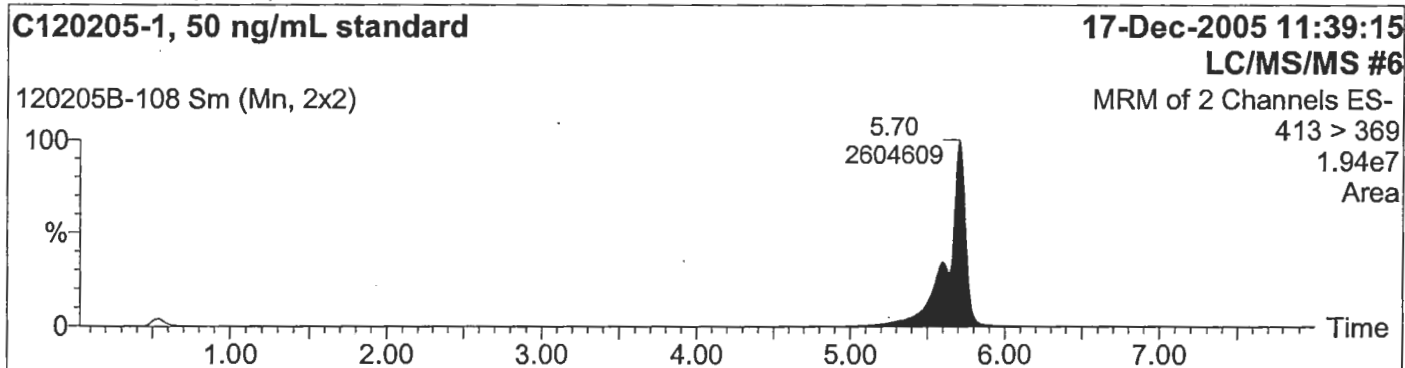
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

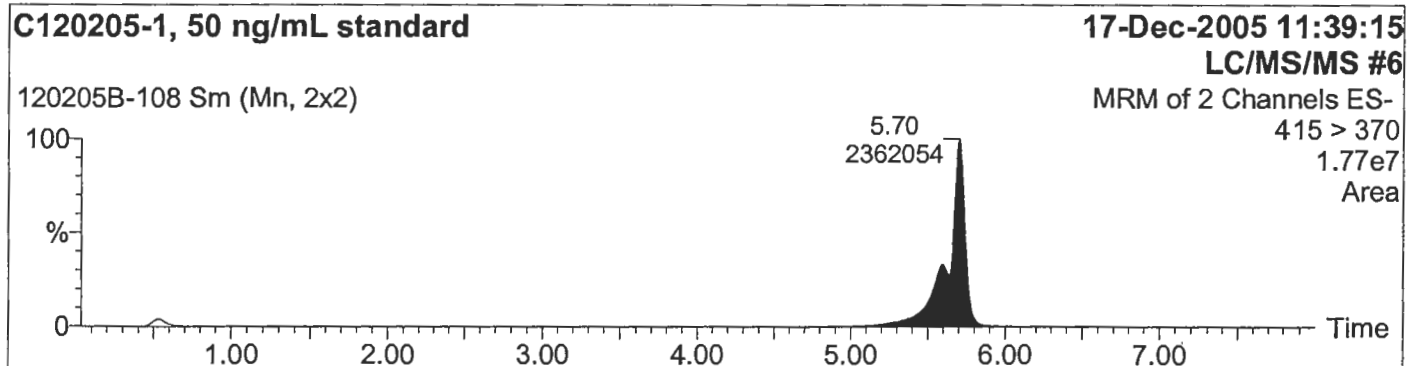
Name: 120205B-108

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 9

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

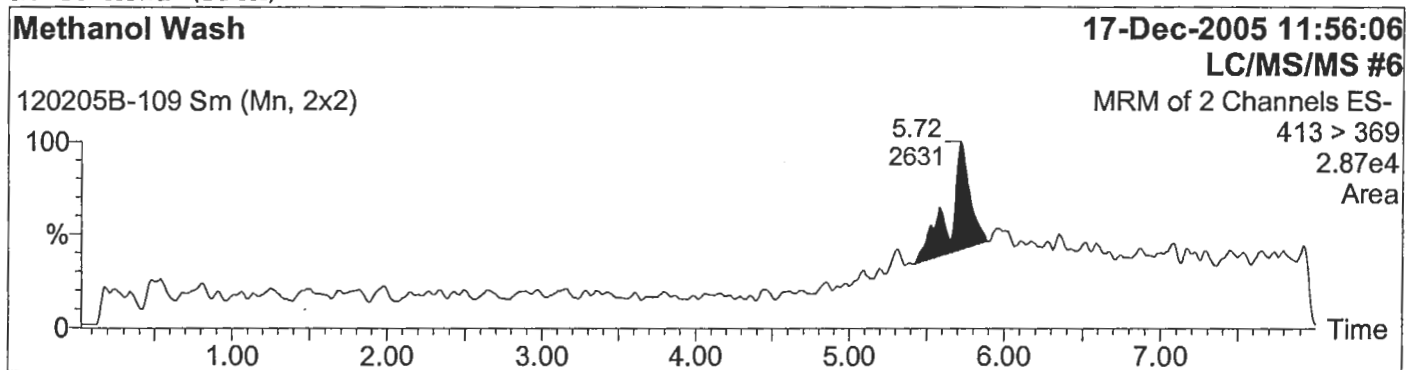
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

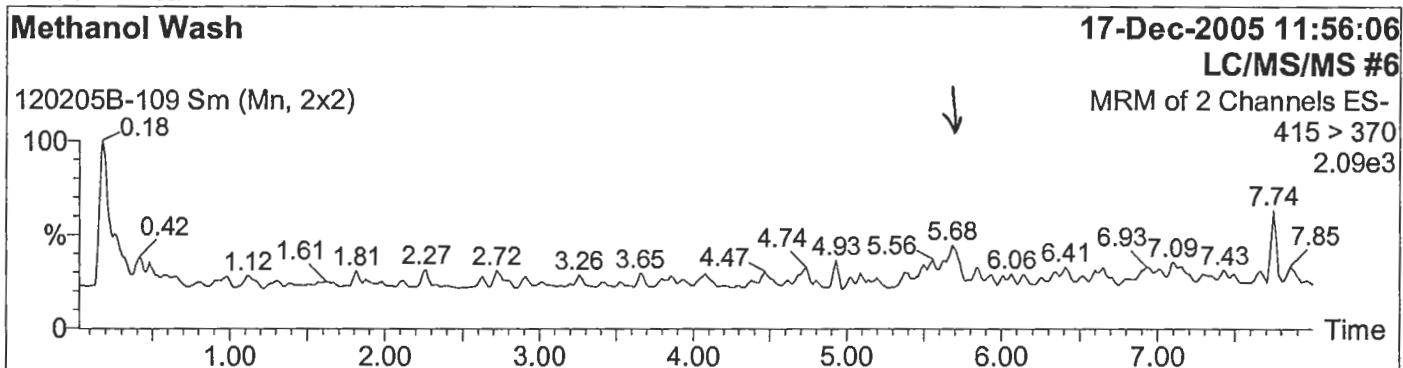
Name: 120205B-109

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 10

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

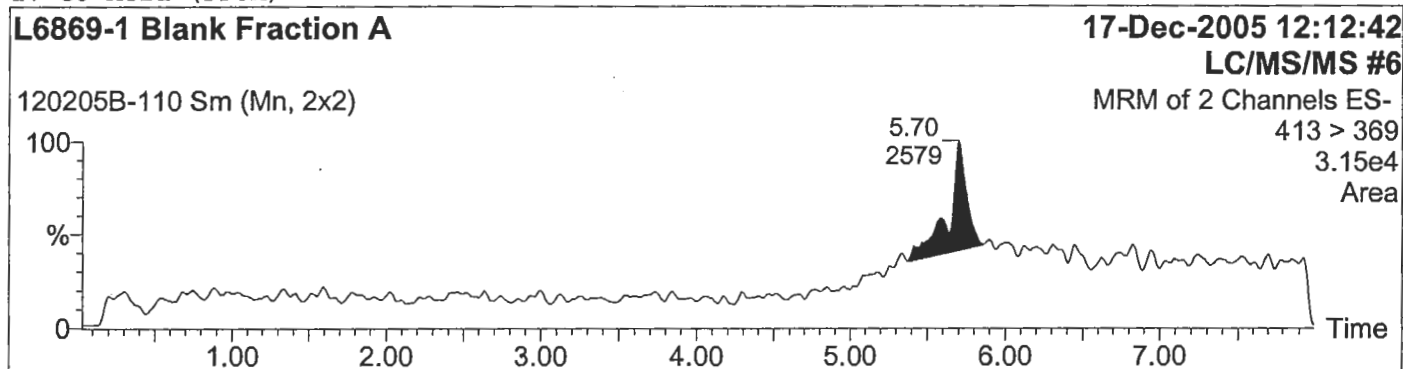
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

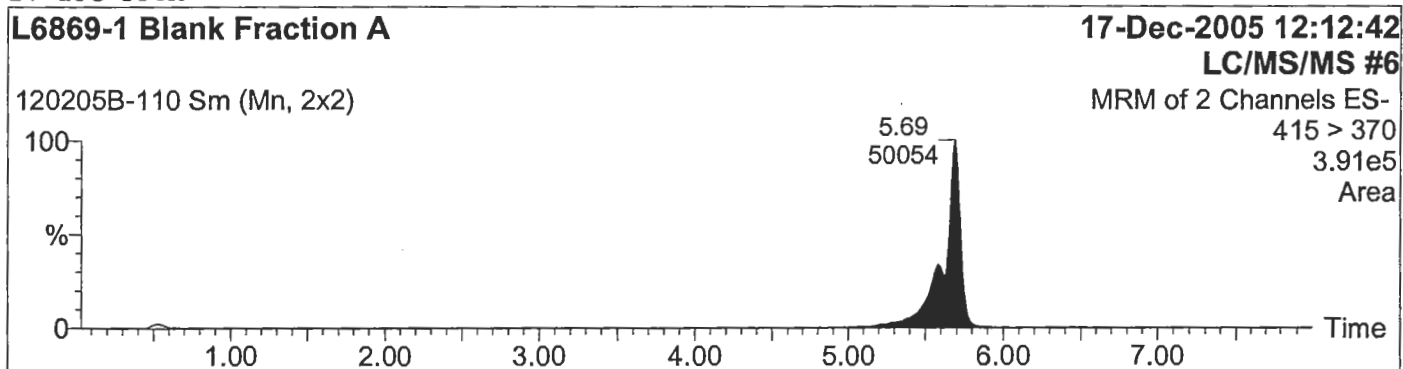
Name: 120205B-110

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 11

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

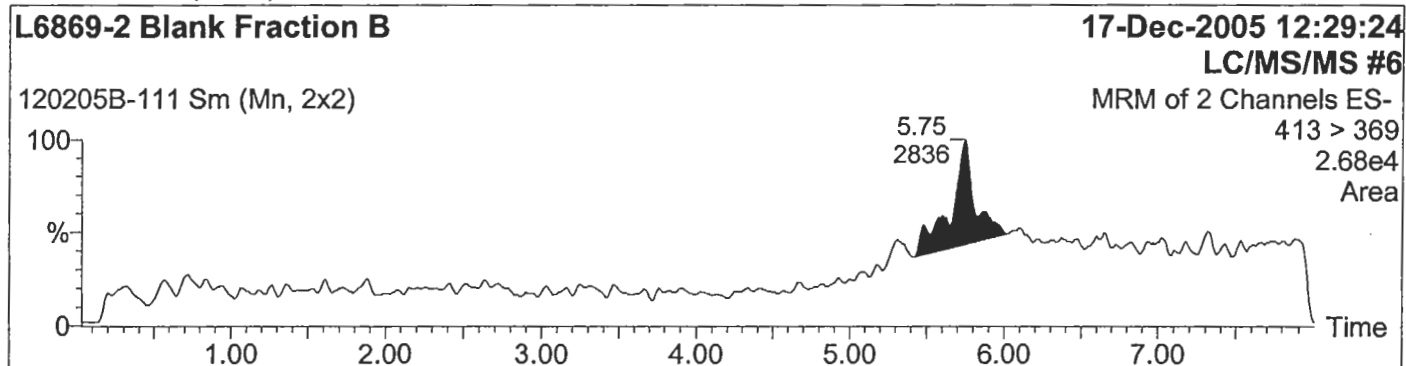
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

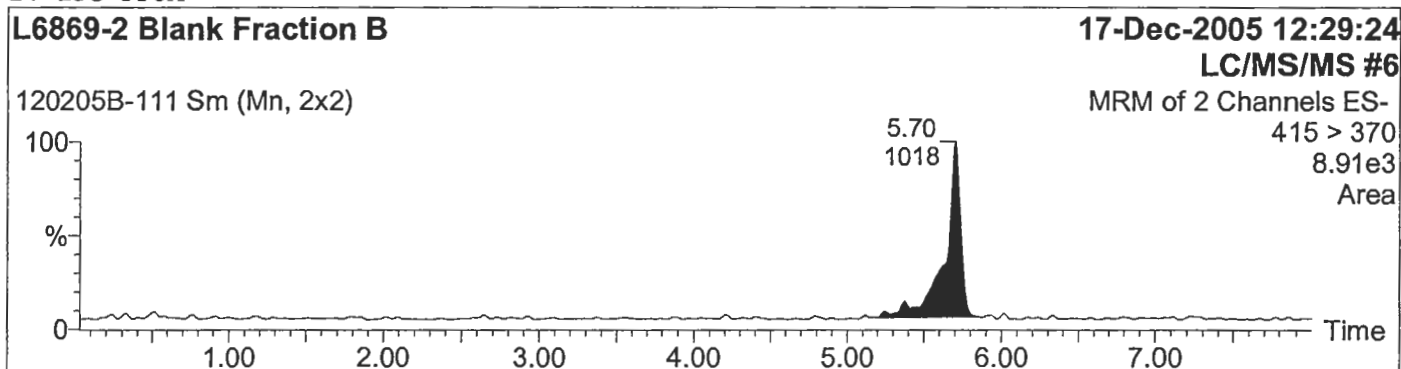
Name: 120205B-111

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 12

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

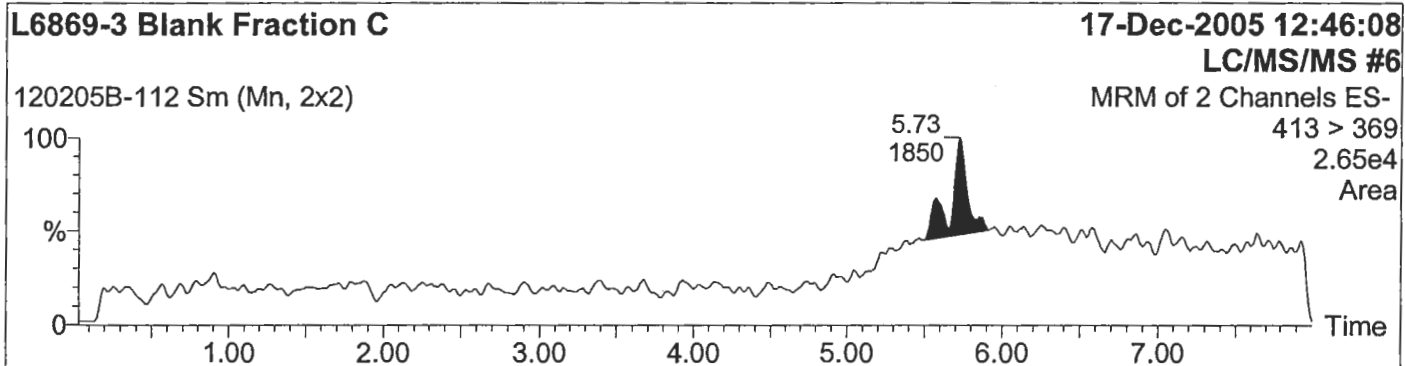
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

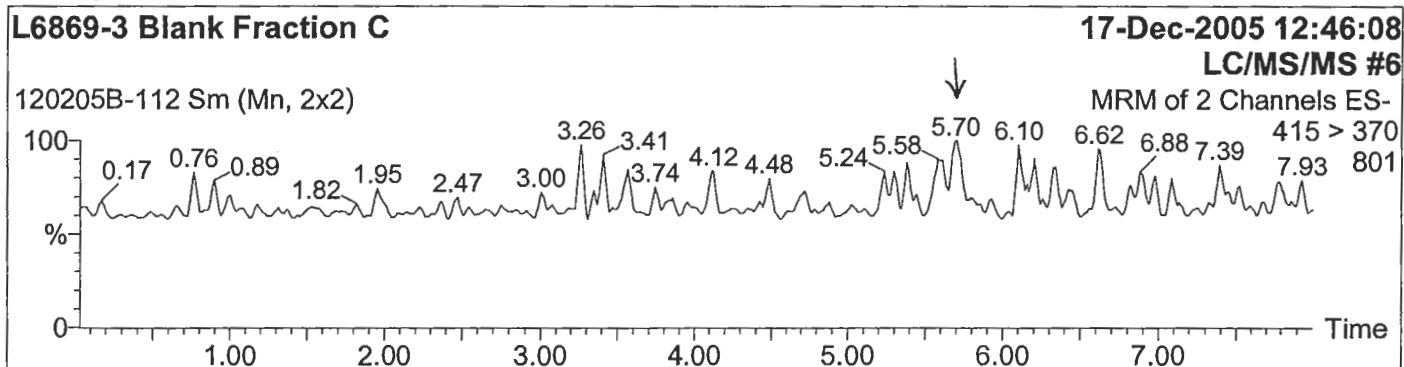
Name: 120205B-112

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 13

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

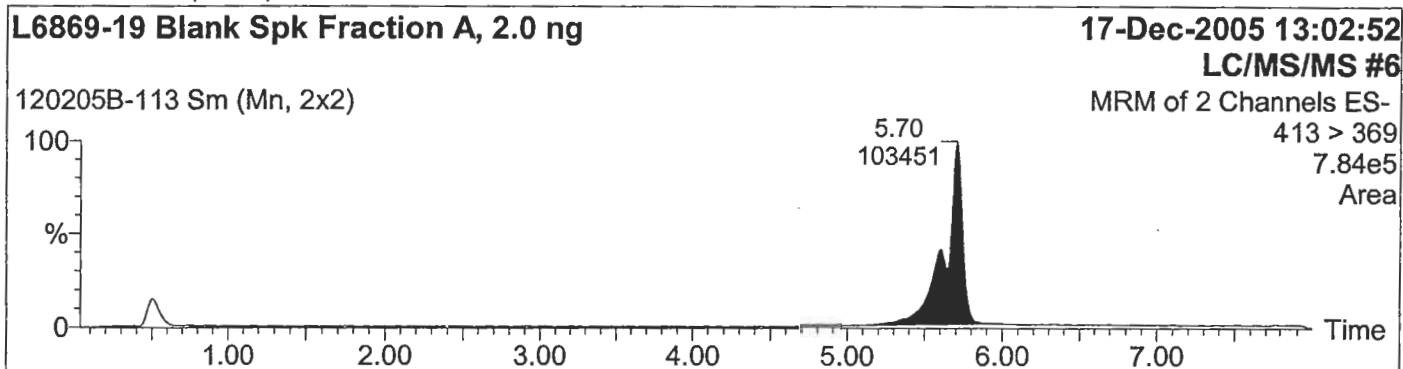
Job Code:

Printed: Wed Dec 21 12:46:01 2005

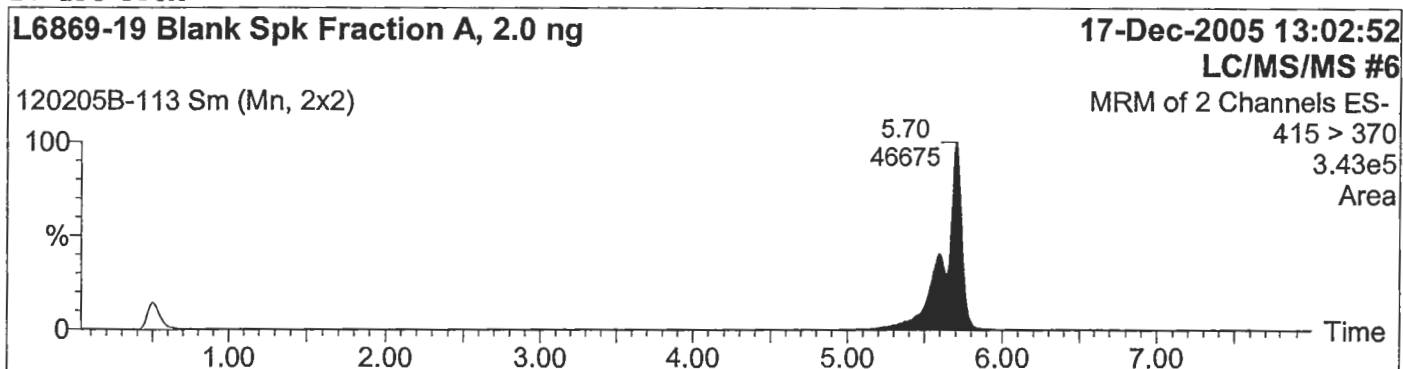
Name: 120205B-113

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

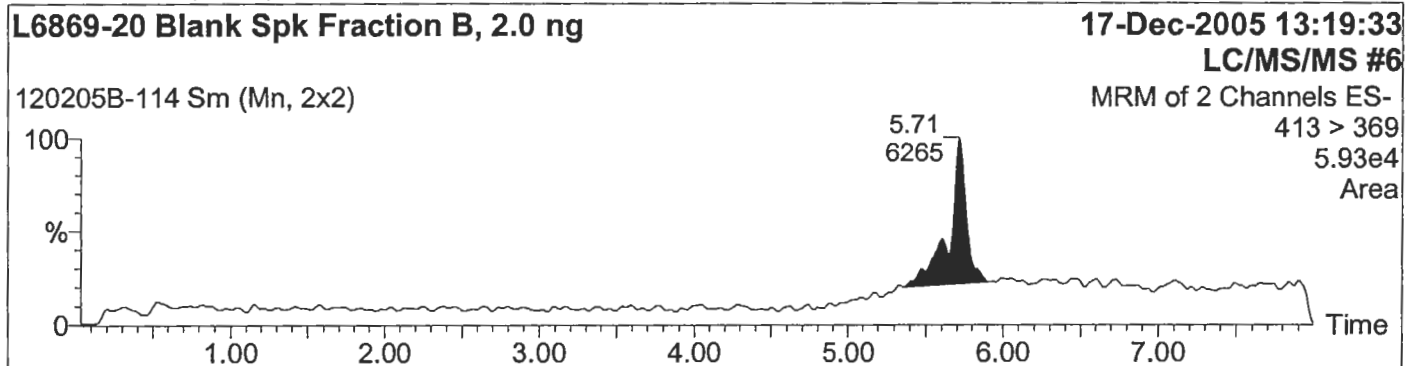
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

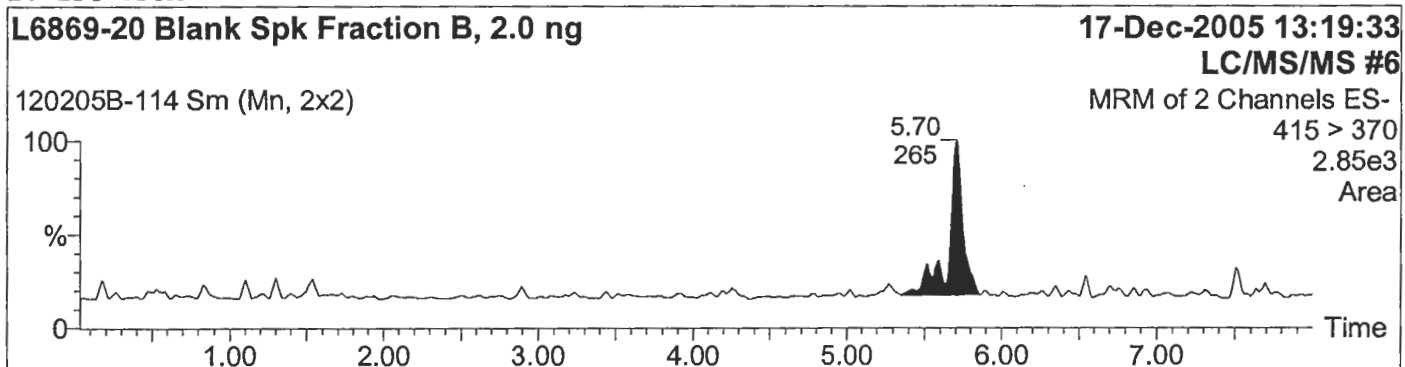
Name: 120205B-114

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

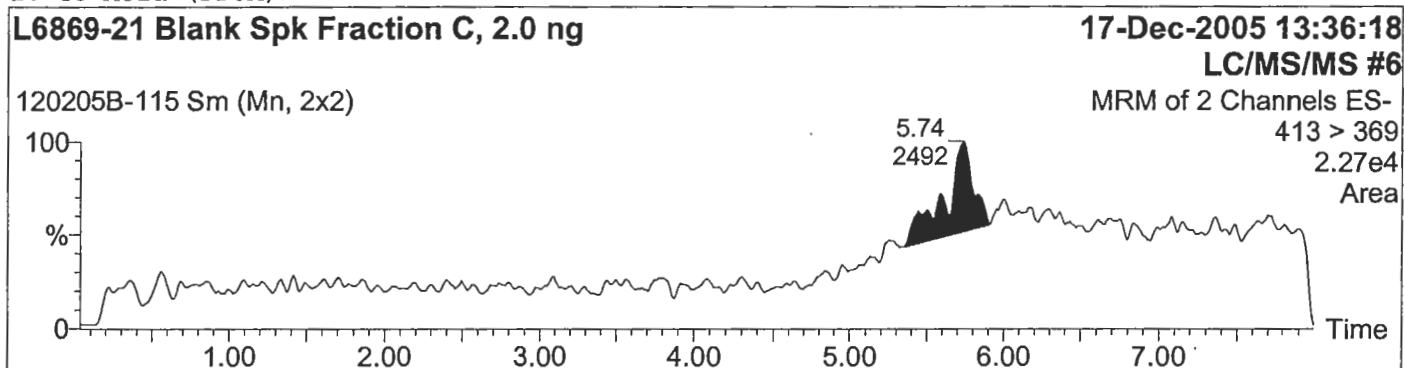
Job Code:

Printed: Wed Dec 21 12:46:01 2005

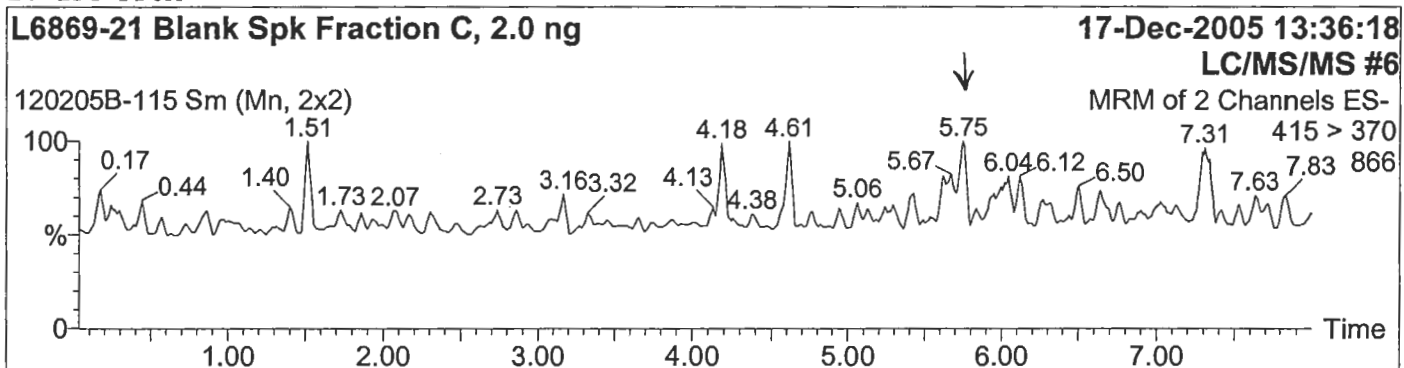
Name: 120205B-115

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

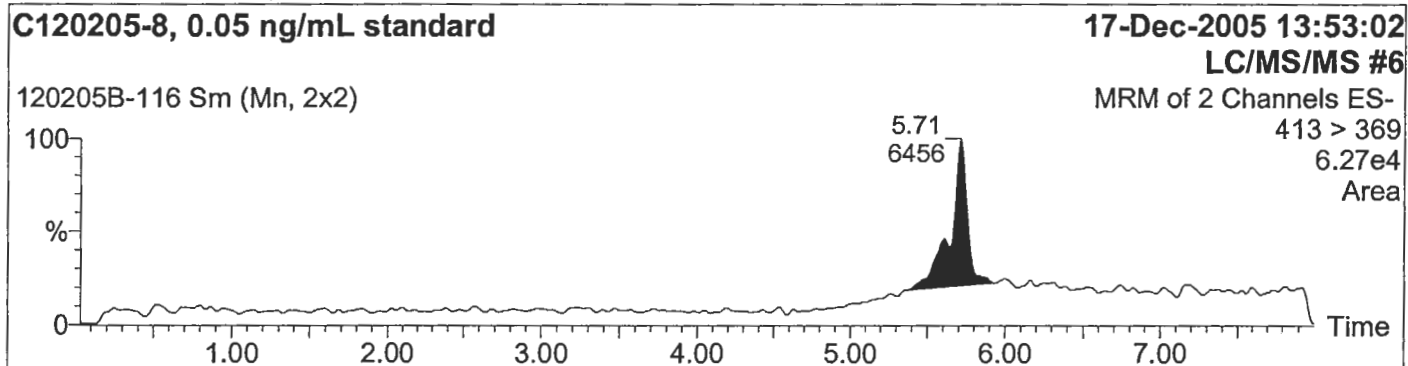
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

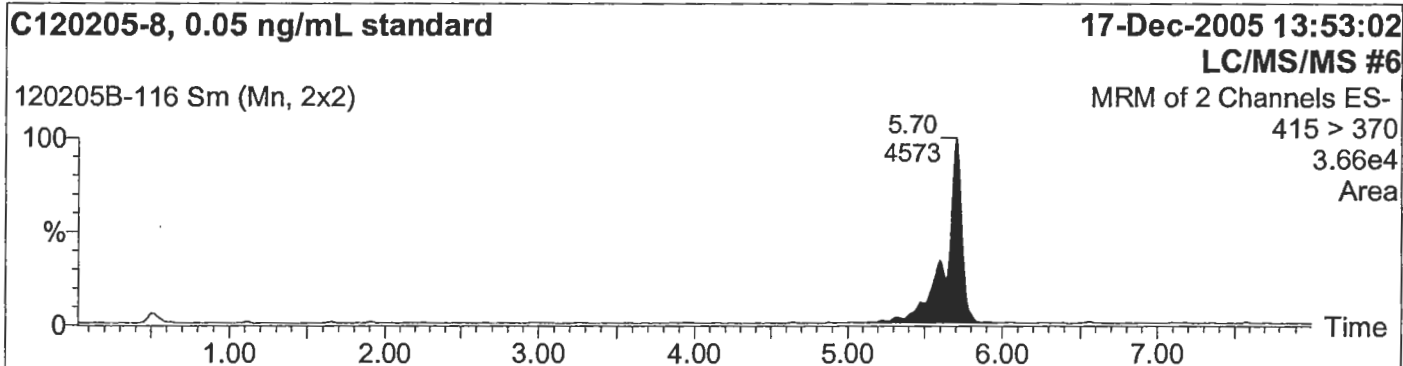
Name: 120205B-116

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

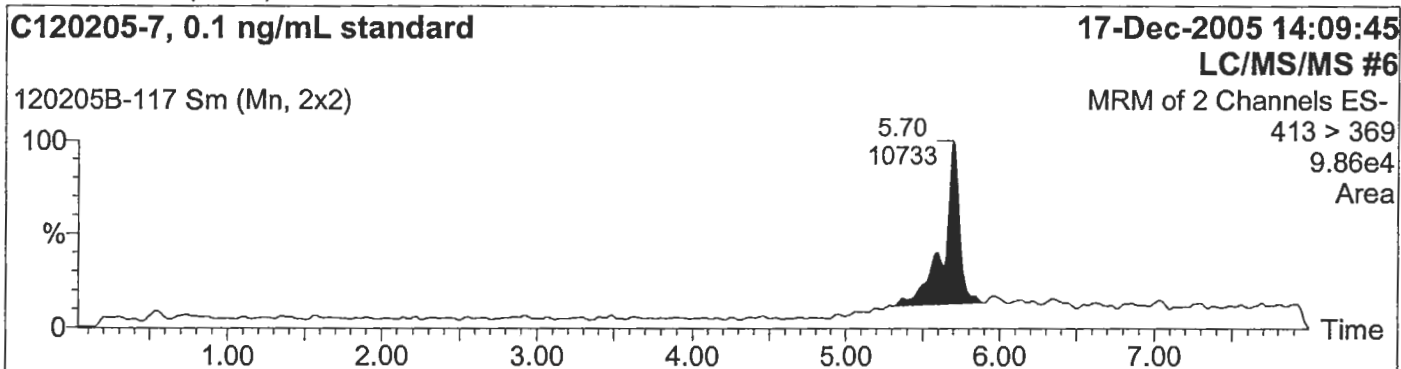
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1.
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

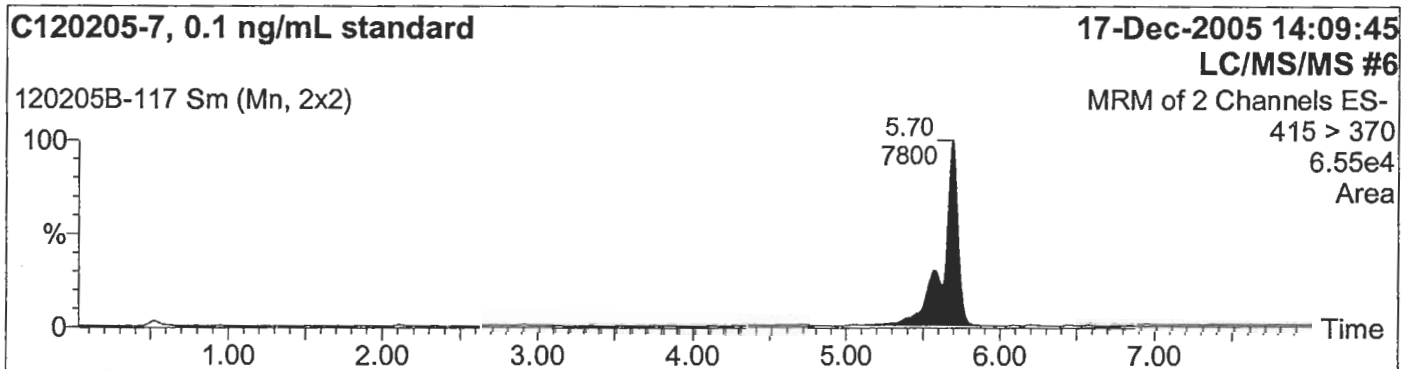
Name: 120205B-117

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

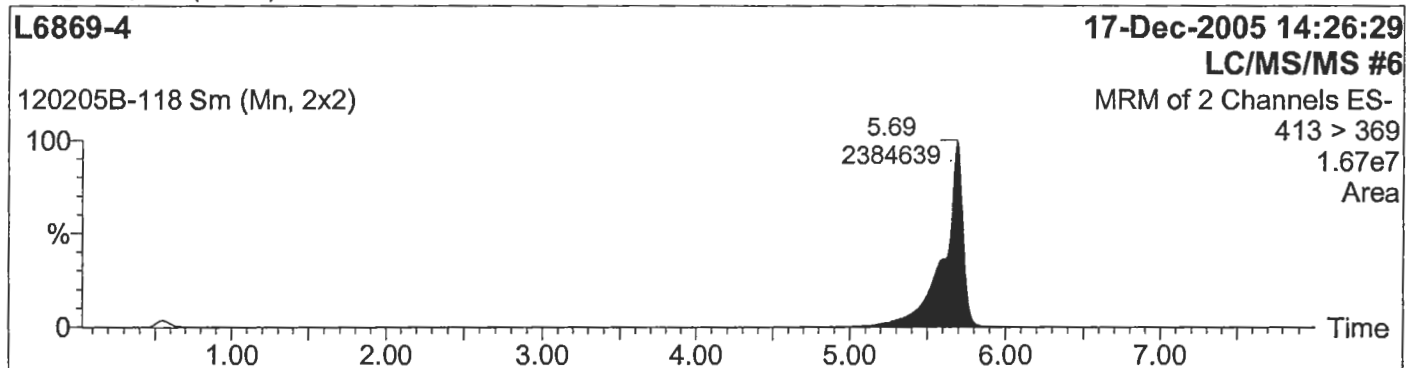
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

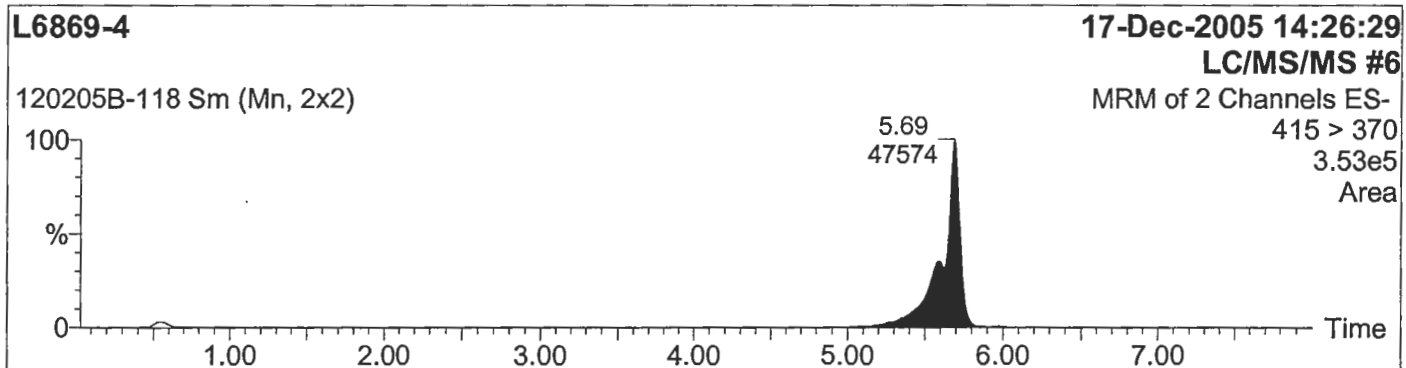
Name: 120205B-118

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

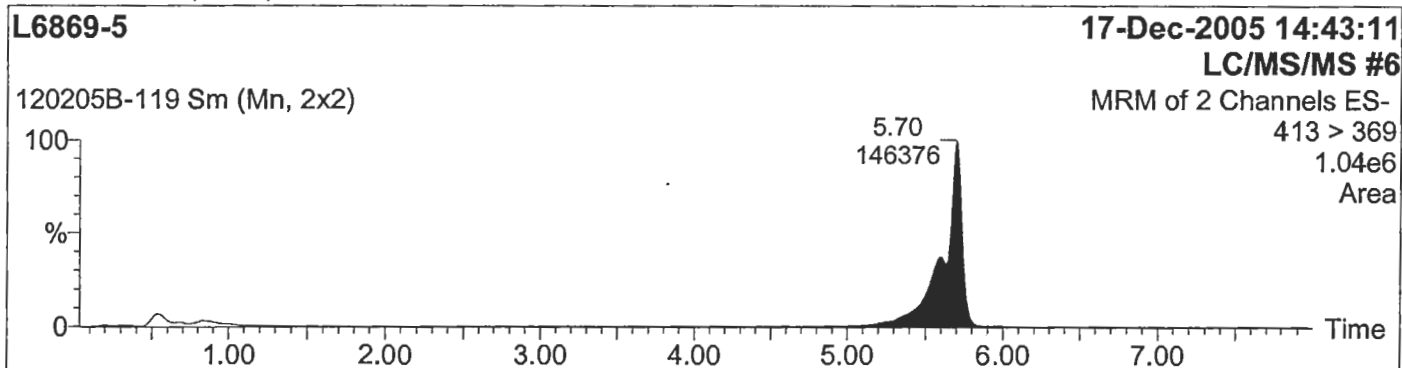
Job Code:

Printed: Wed Dec 21 12:46:01 2005

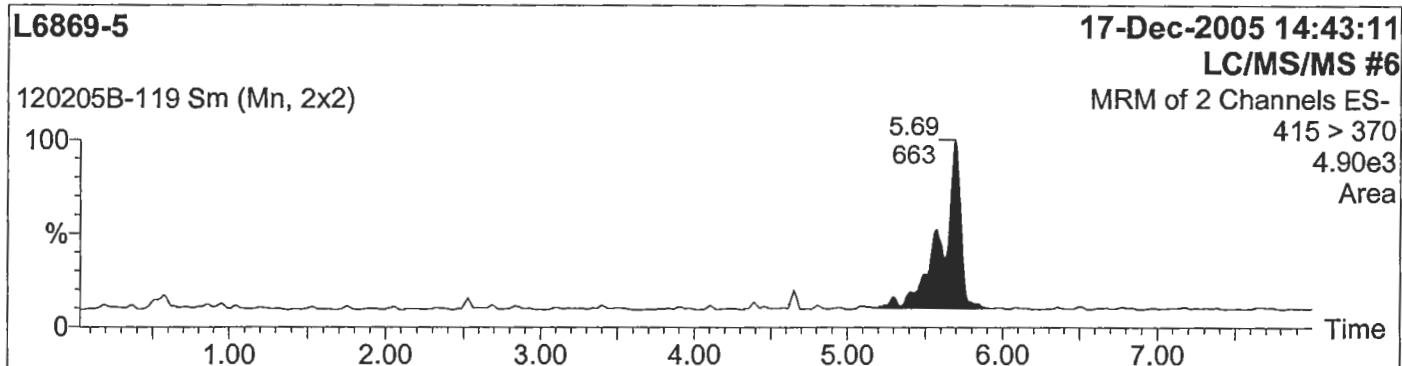
Name: 120205B-119

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

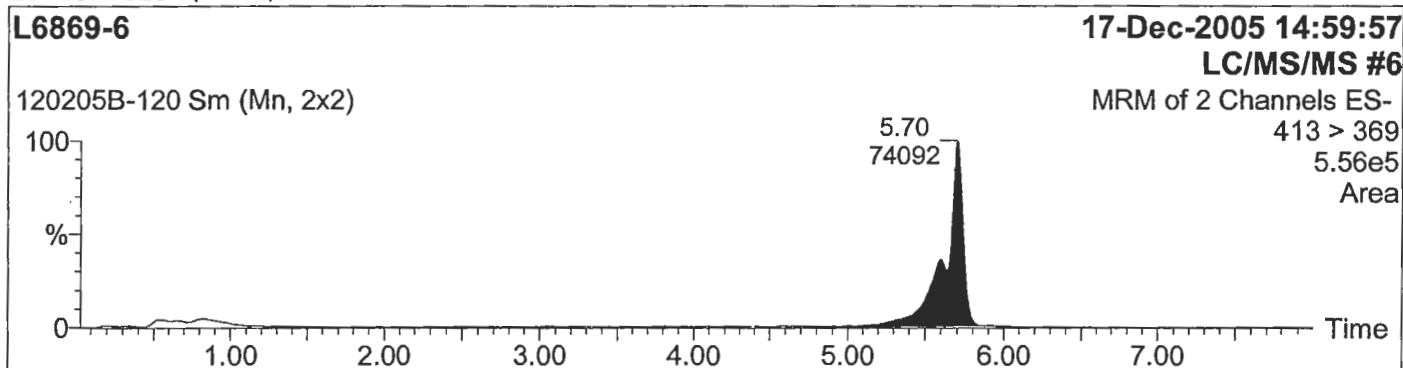
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

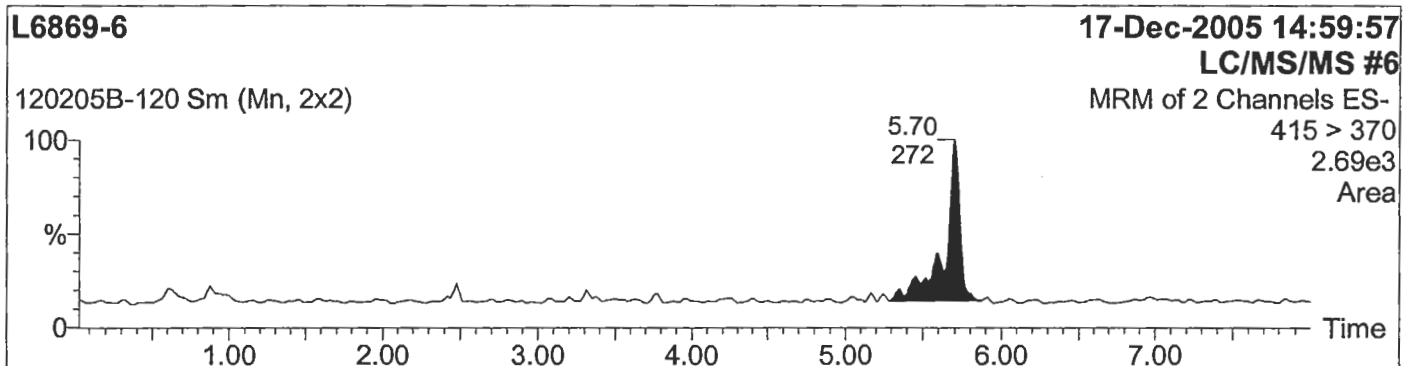
Name: 120205B-120

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 21

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

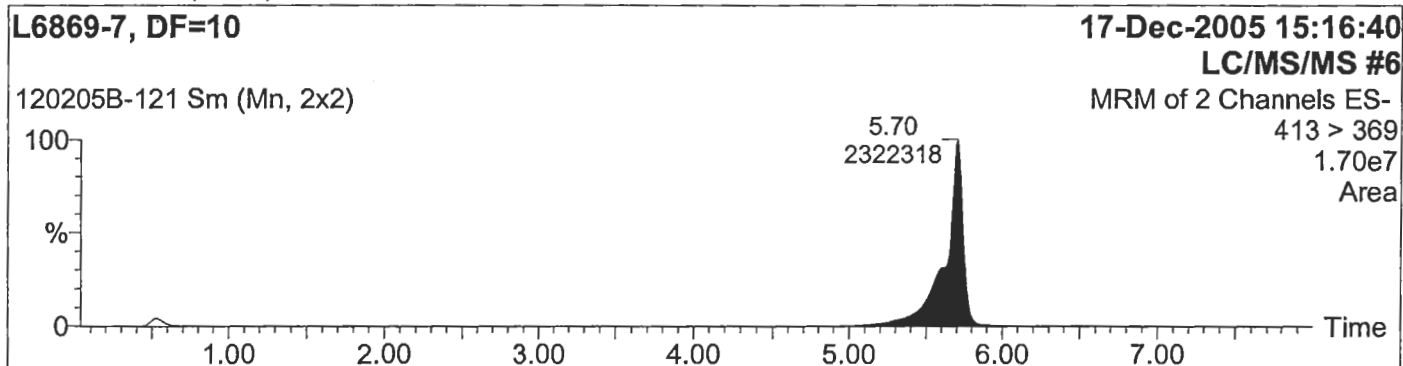
Job Code:

Printed: Wed Dec 21 12:46:01 2005

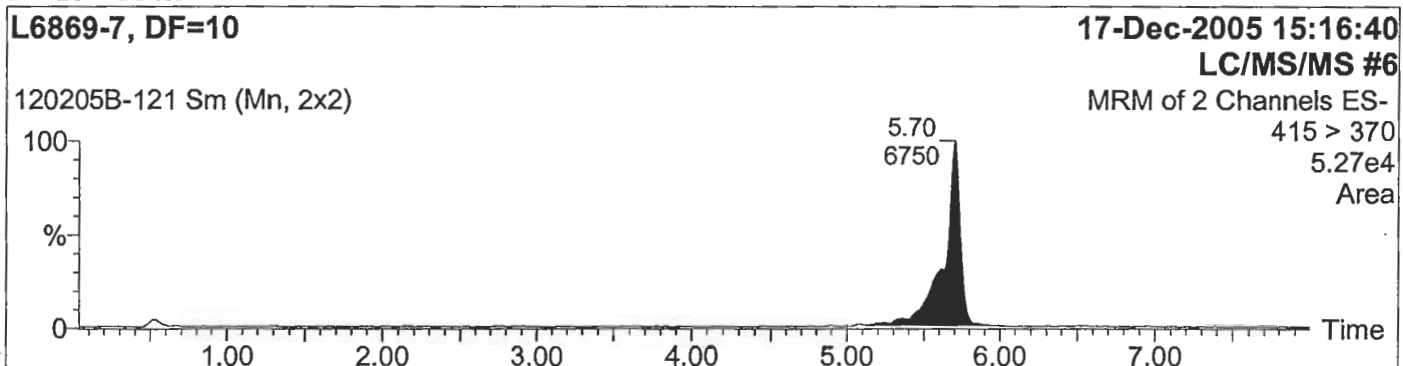
Name: 120205B-121

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

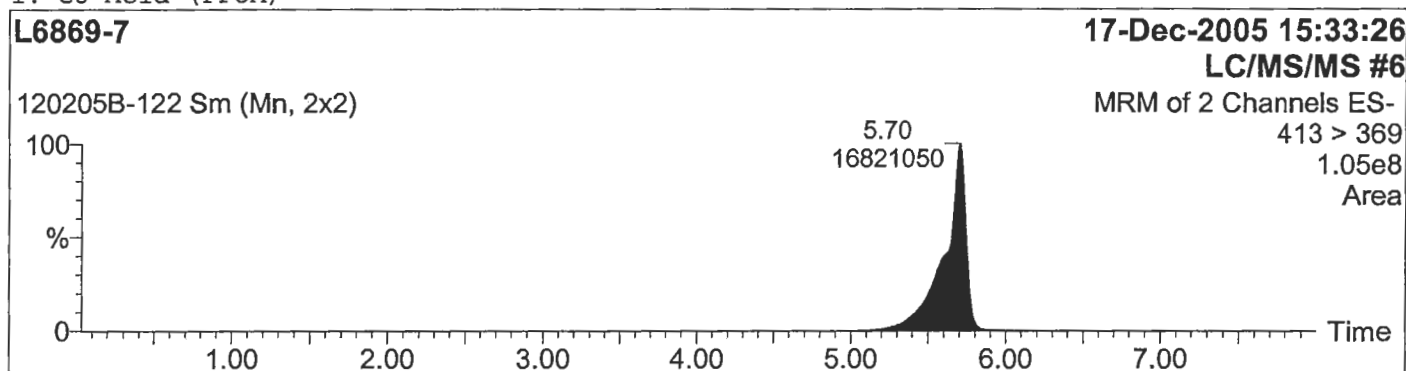
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

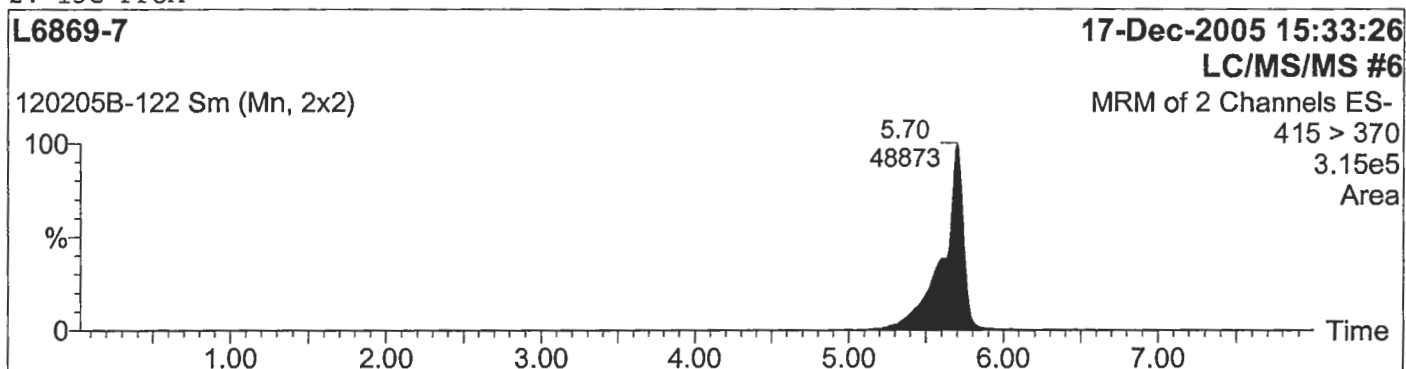
Name: 120205B-122

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

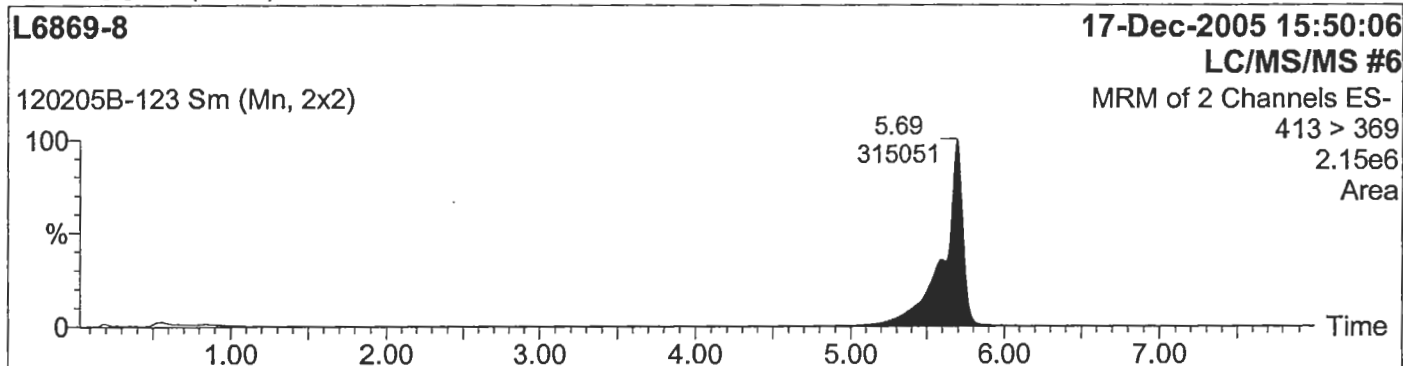
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

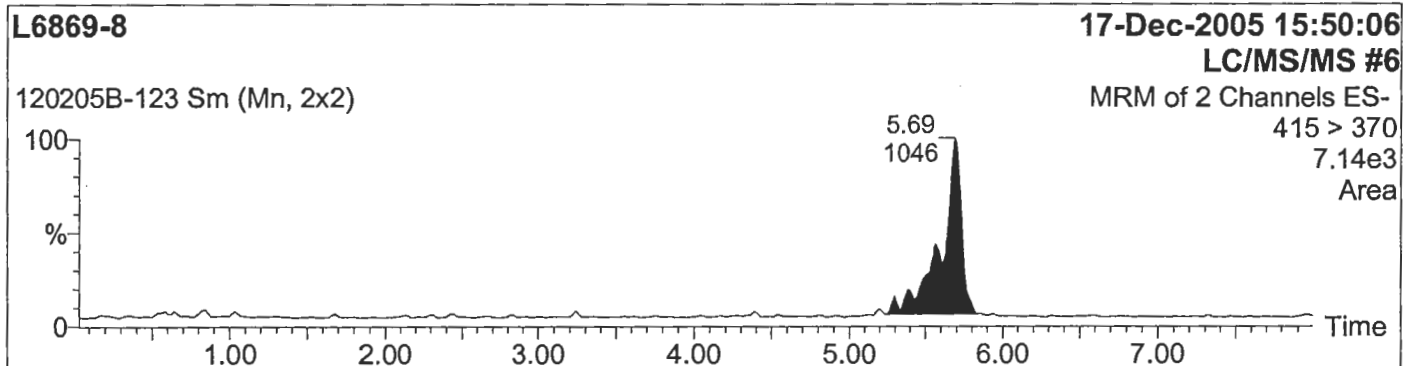
Name: 120205B-123

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

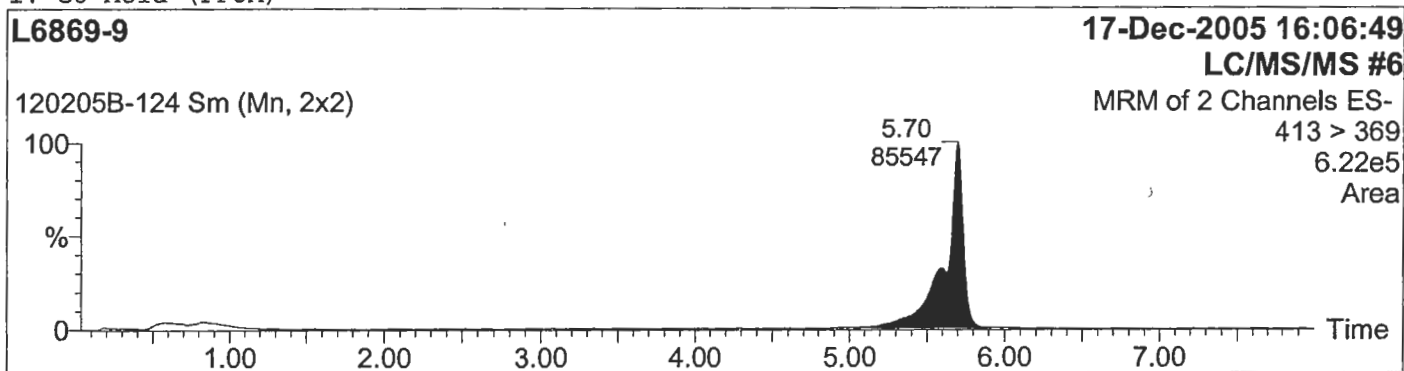
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

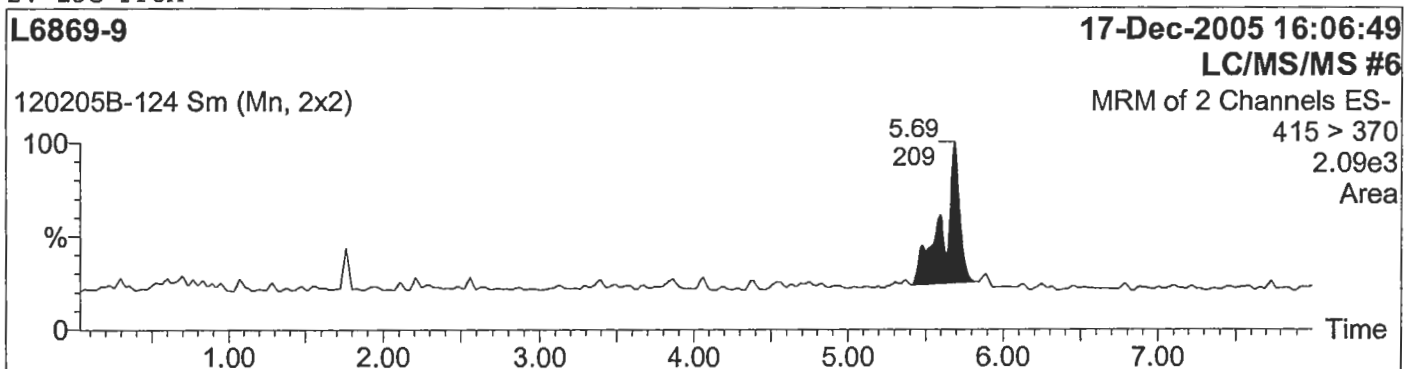
Name: 120205B-124

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 25

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-125

Text:

1: C8 Acid (PFOA)

C120205-6, 0.2 ng/mL standard

17-Dec-2005 16:23:34

LC/MS/MS #6

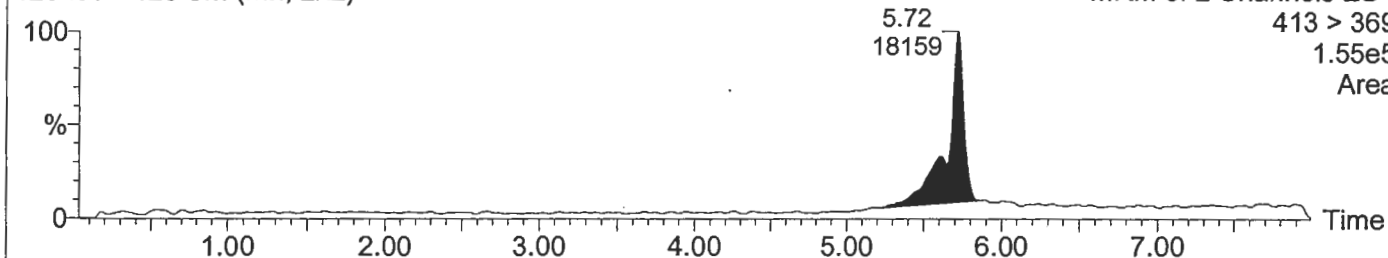
MRM of 2 Channels ES-

413 > 369

1.55e5

Area

120205B-125 Sm (Mn, 2x2)



2: 13C PFOA

C120205-6, 0.2 ng/mL standard

17-Dec-2005 16:23:34

LC/MS/MS #6

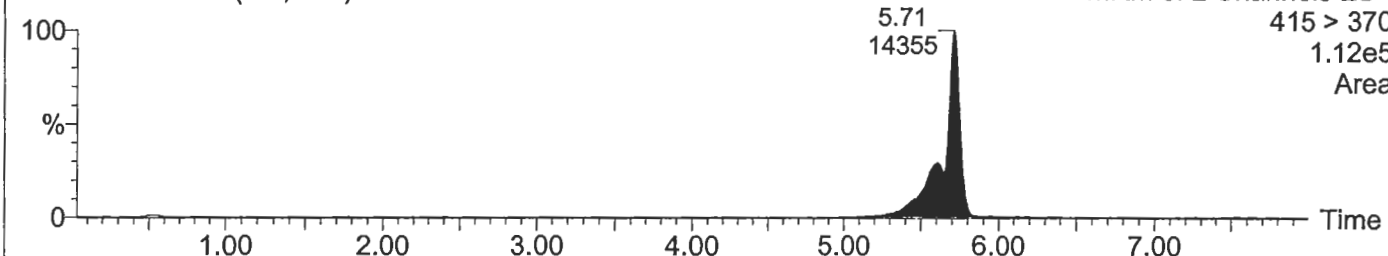
MRM of 2 Channels ES-

415 > 370

1.12e5

Area

120205B-125 Sm (Mn, 2x2)



Quantify Sample Report

Page 26

Study No.: I6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-126

Text:

1: C8 Acid (PFOA)

C120205-5, 0.5 ng/mL standard

17-Dec-2005 16:40:15

LC/MS/MS #6

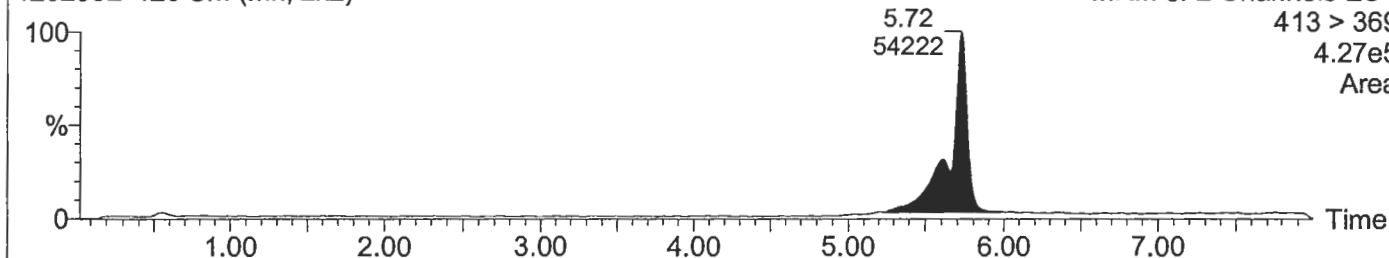
120205B-126 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

4.27e5

Area



2: 13C PFOA

C120205-5, 0.5 ng/mL standard

17-Dec-2005 16:40:15

LC/MS/MS #6

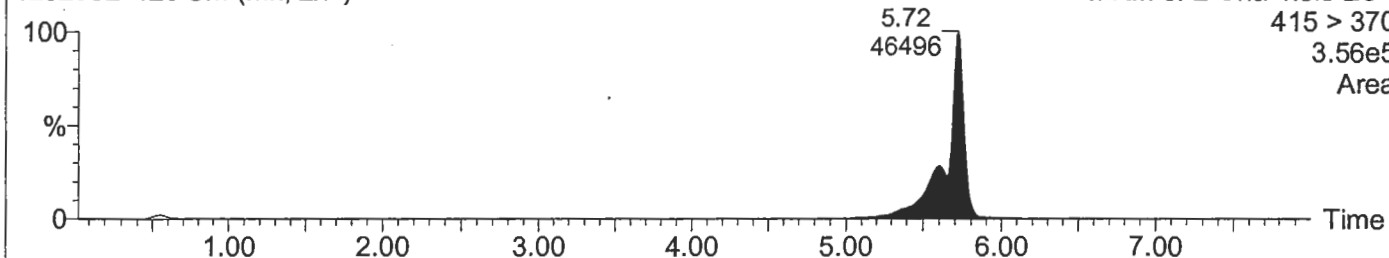
120205B-126 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

3.56e5

Area



Quantify Sample Report

Page 27

Study No.:L6869, Set No.:120205B, Ext.Date:12/02/05, Analyst: C.Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-127

Text:

1: C8 Acid (PFOA)

L6869-10, DF=100

17-Dec-2005 16:56:58

LC/MS/MS #6

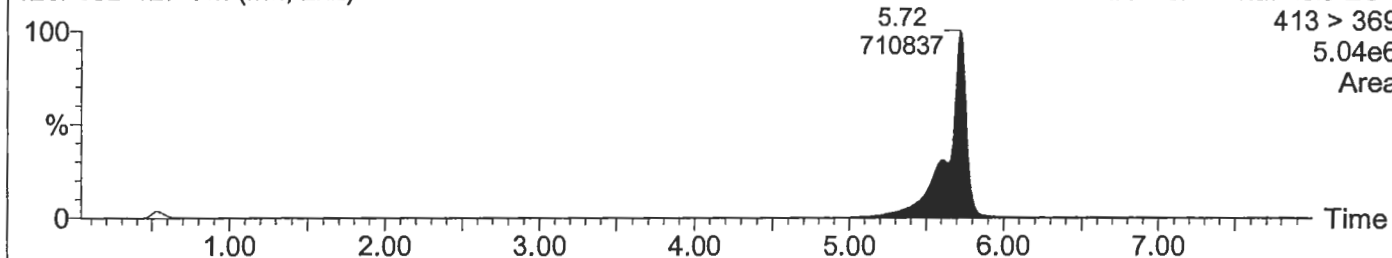
120205B-127 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

5.04e6

Area



2: 13C PFOA

L6869-10, DF=100

17-Dec-2005 16:56:58

LC/MS/MS #6

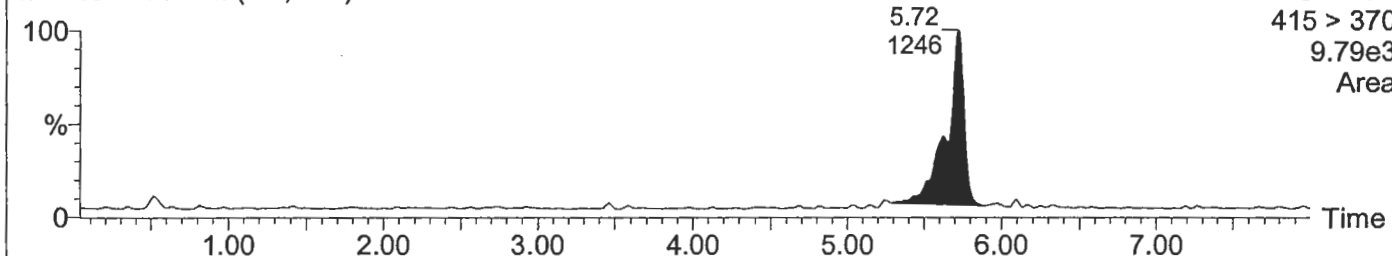
120205B-127 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

9.79e3

Area



Quantify Sample Report

Page 28

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

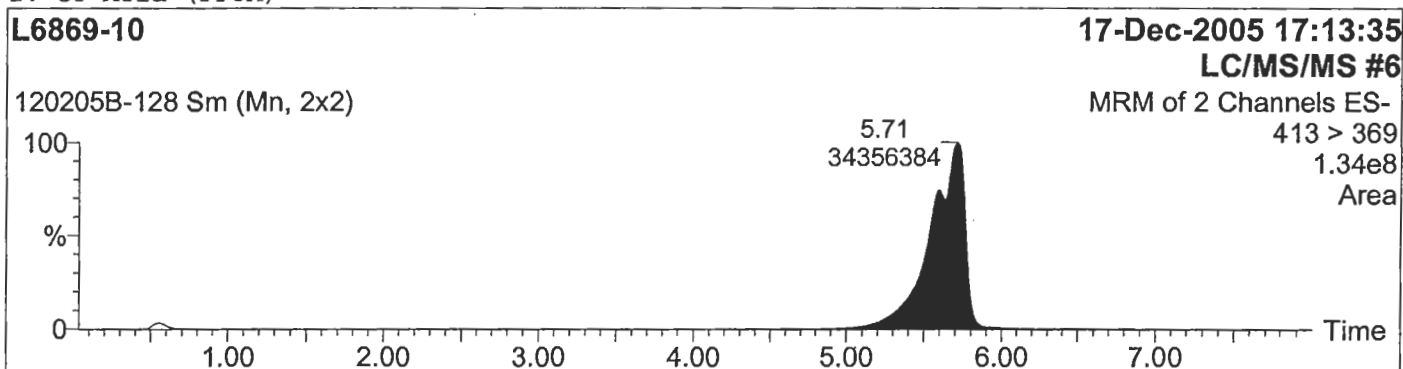
Job Code:

Printed: Wed Dec 21 12:46:01 2005

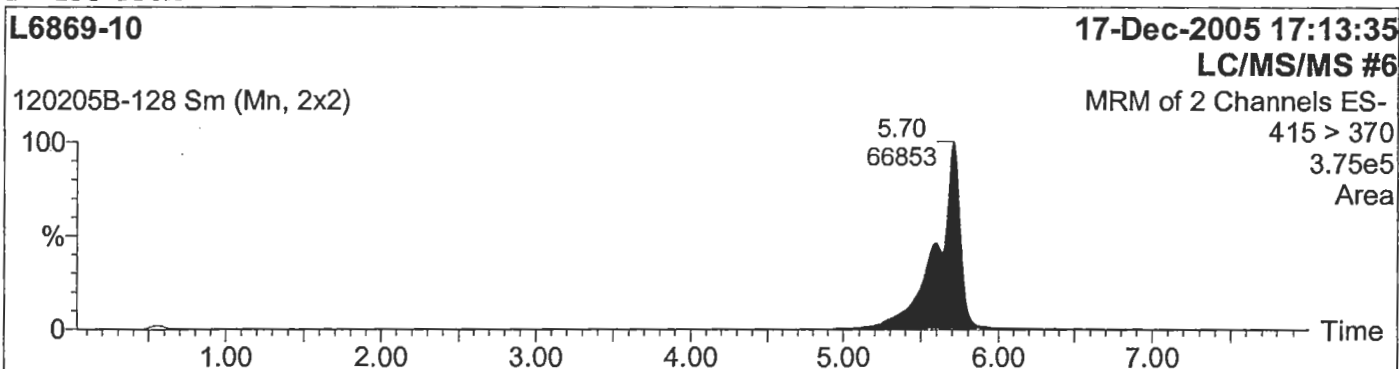
Name: 120205B-128

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 29

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

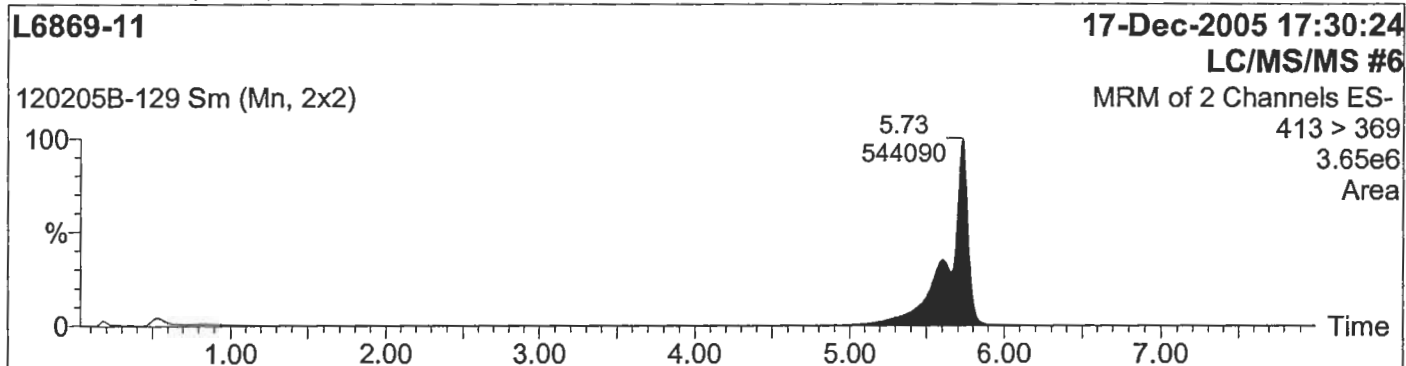
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

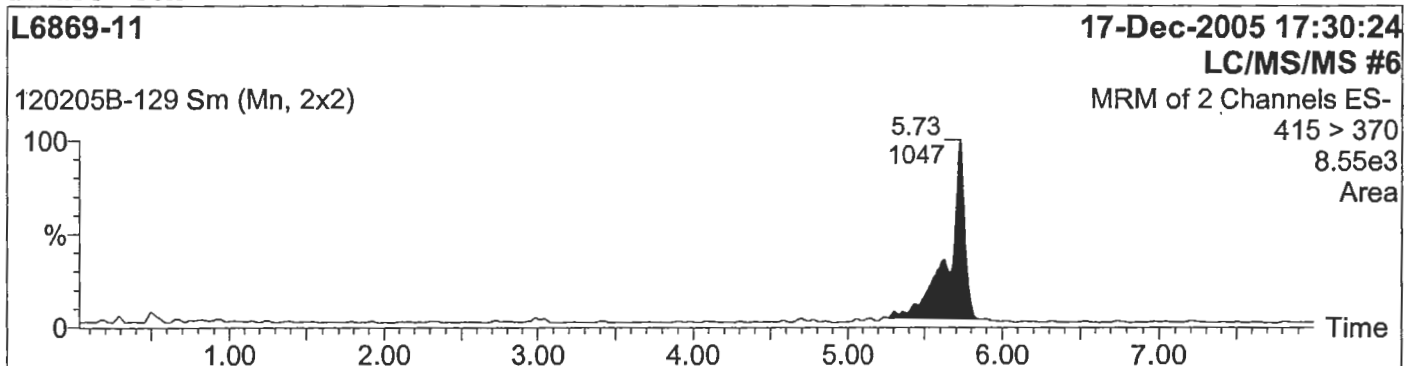
Name: 120205B-129

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 30

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

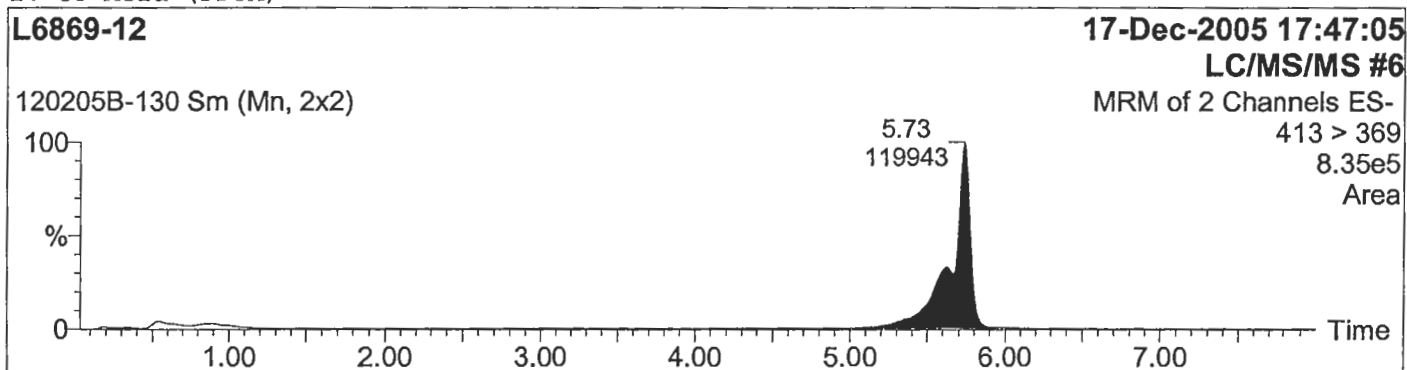
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

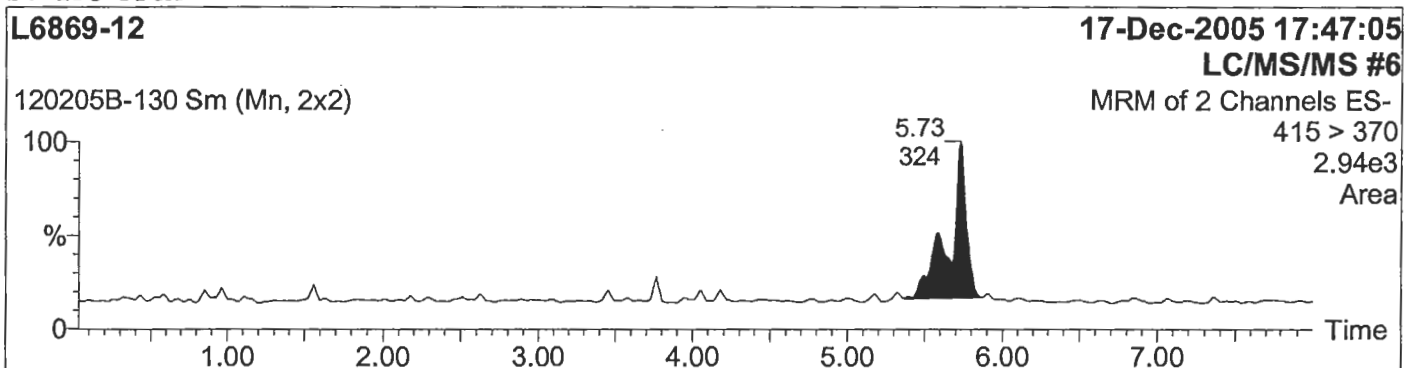
Name: 120205B-130

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-131

Text:

1: C8 Acid (PFOA)

L6869-13, DF=100

17-Dec-2005 18:03:52

LC/MS/MS #6

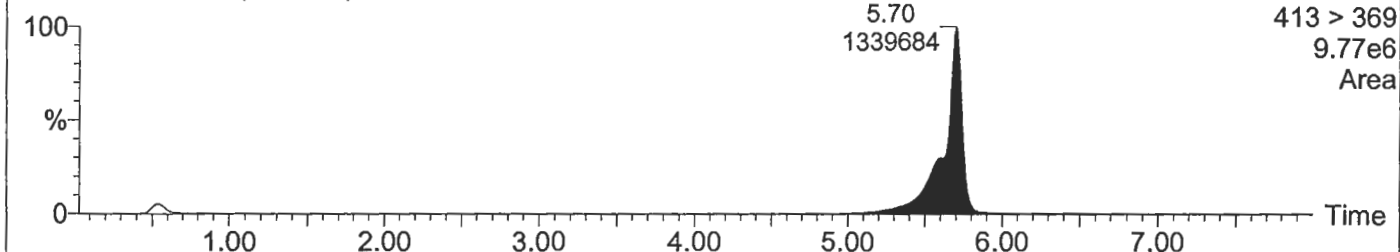
MRM of 2 Channels ES-

413 > 369

9.77e6

Area

120205B-131 Sm (Mn, 2x2)



2: 13C PFOA

L6869-13, DF=100

17-Dec-2005 18:03:52

LC/MS/MS #6

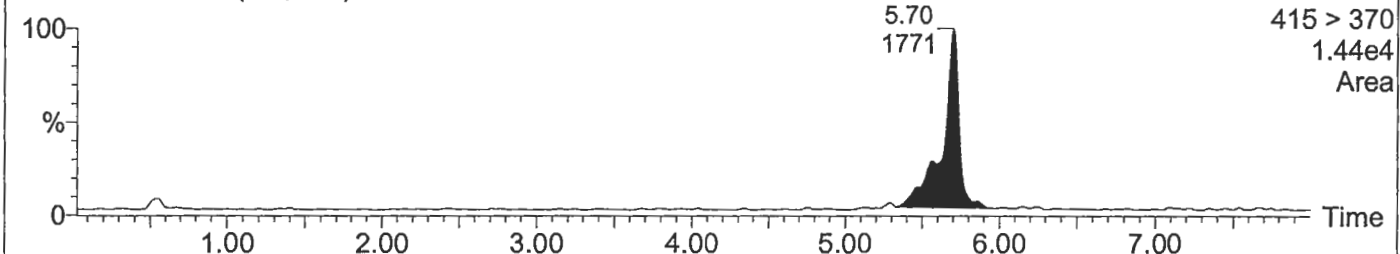
MRM of 2 Channels ES-

415 > 370

1.44e4

Area

120205B-131 Sm (Mn, 2x2)



Quantify Sample Report

Page 32

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

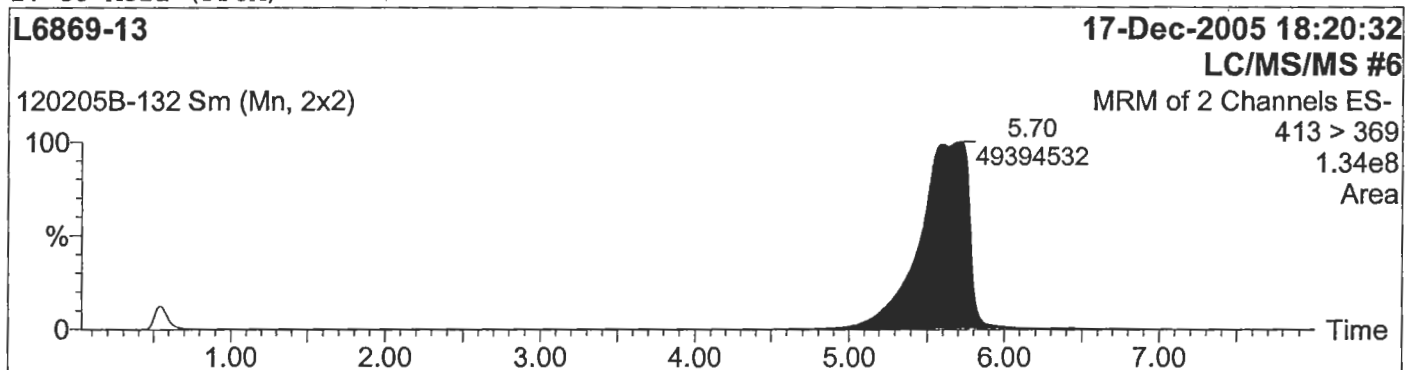
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

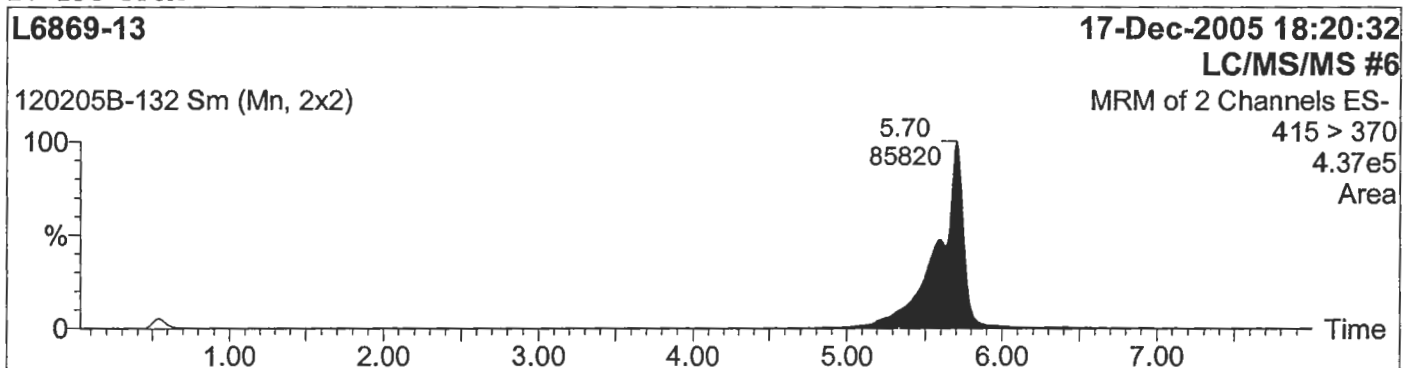
Name: 120205B-132

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 33

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

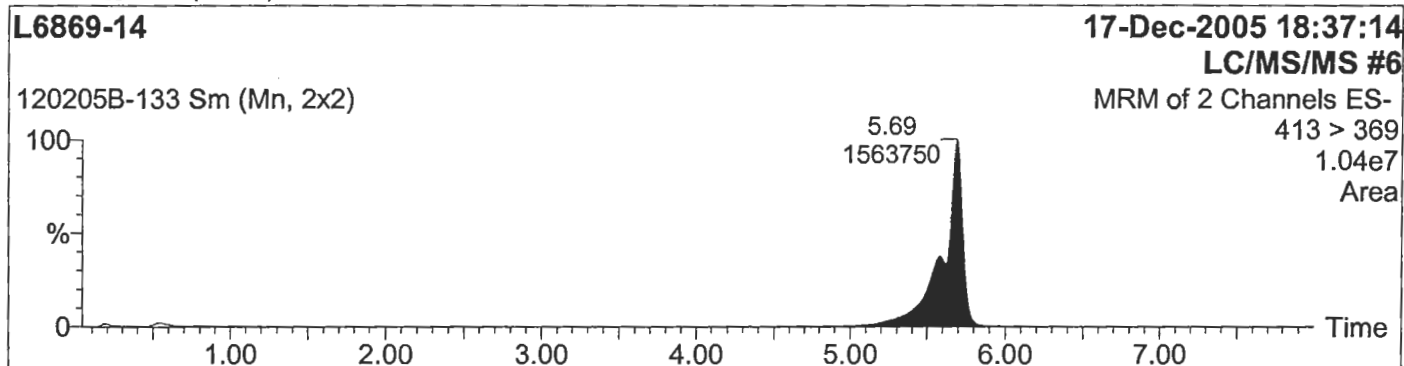
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

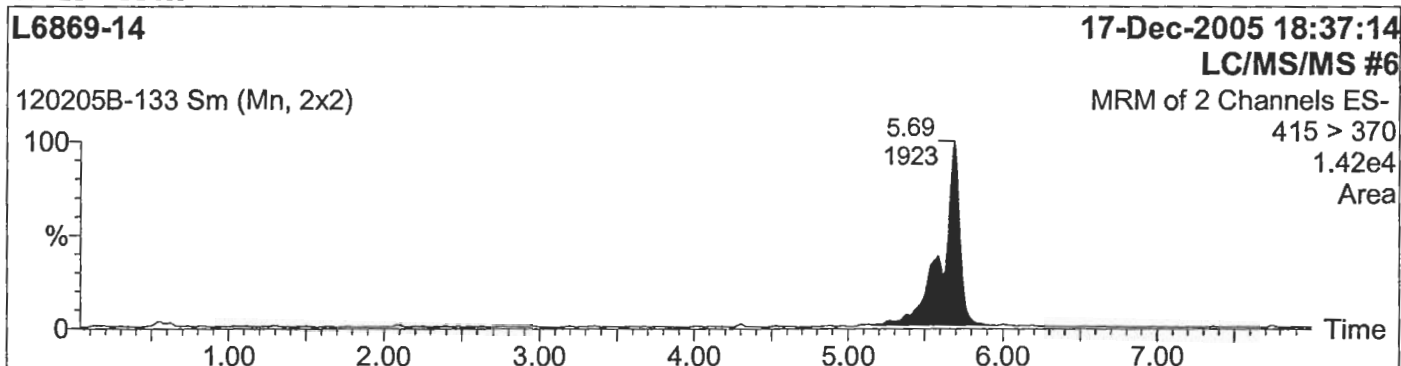
Name: 120205B-133

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 34

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

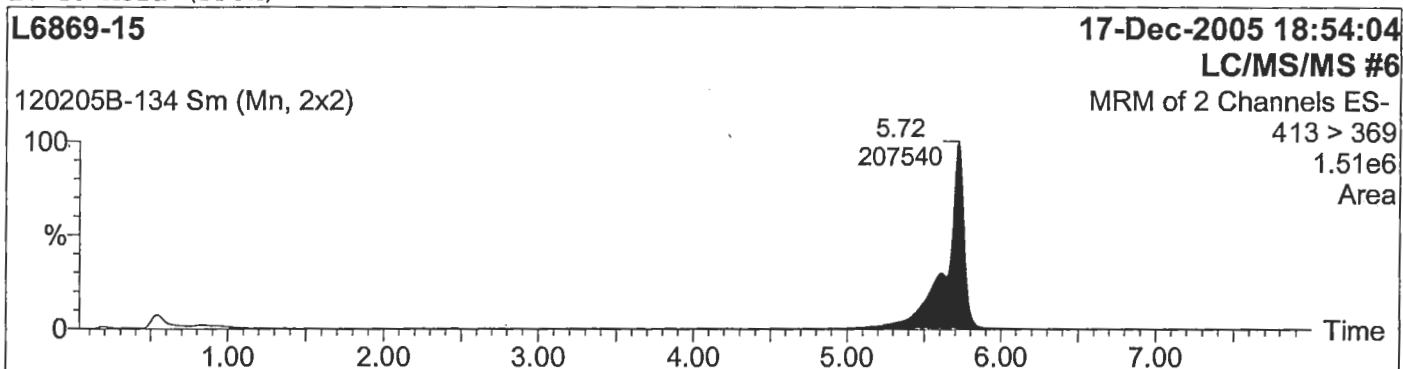
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

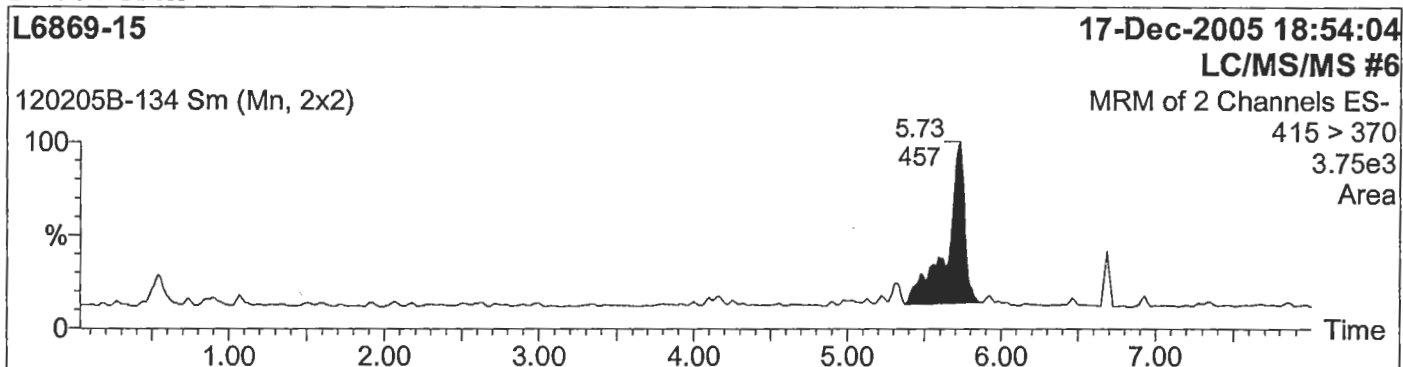
Name: 120205B-134

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 35

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

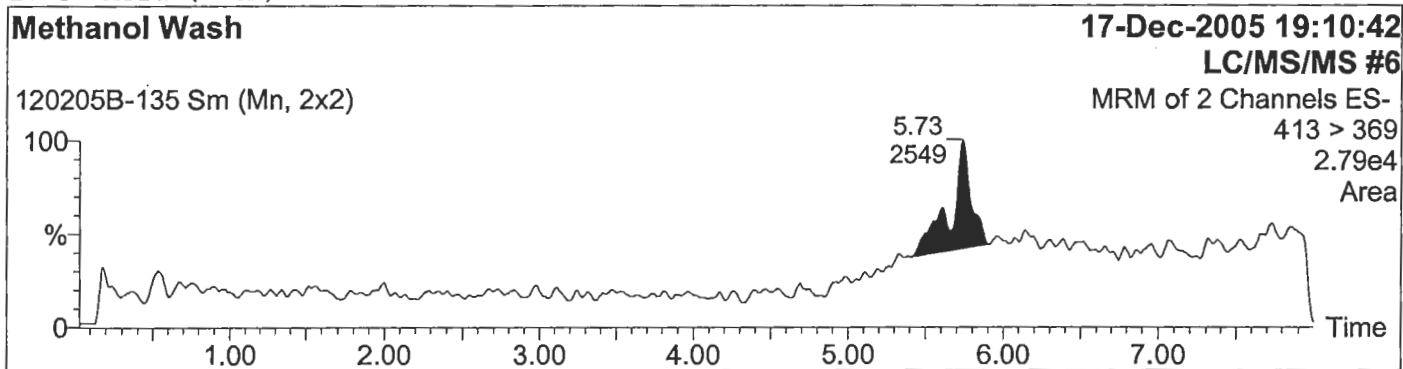
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

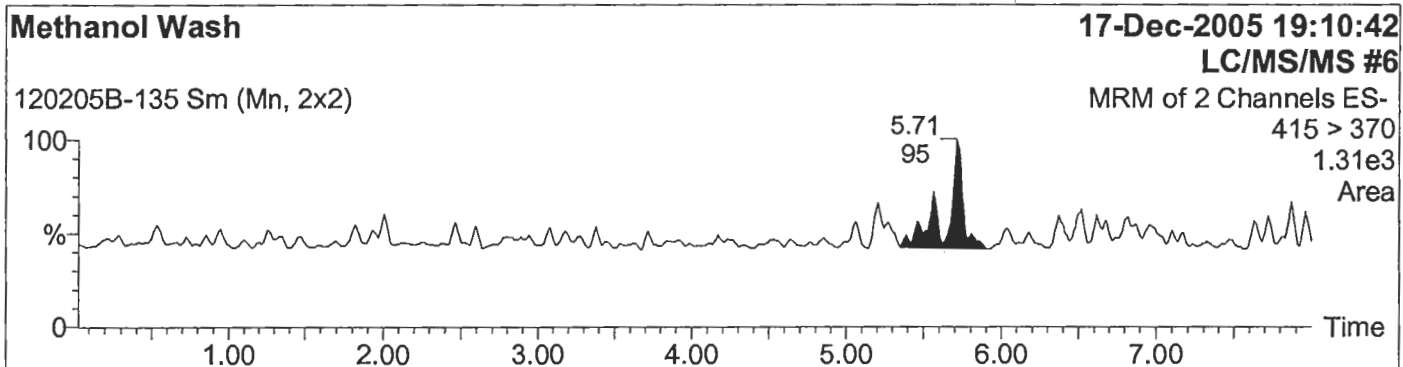
Name: 120205B-135

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 36

Study No.:L6869, Set No.:120205B, Ext.Date:12/02/05, Analyst: C.Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

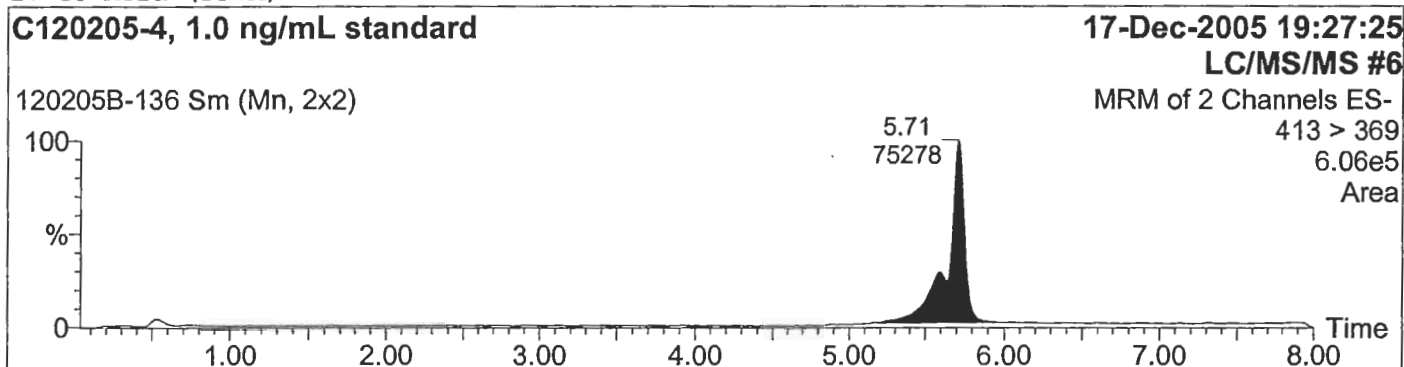
Job Code:

Printed: Wed Dec 21 12:46:01 2005

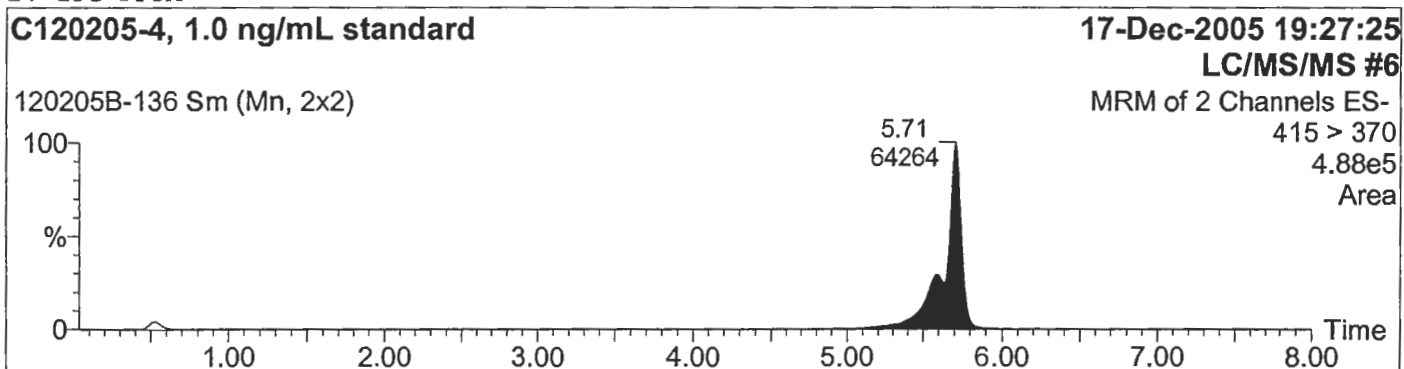
Name: 120205B-136

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 37

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-137

Text:

1: C8 Acid (PFOA)

C120205-3, 5.0 ng/mL standard

17-Dec-2005 19:44:07

LC/MS/MS #6

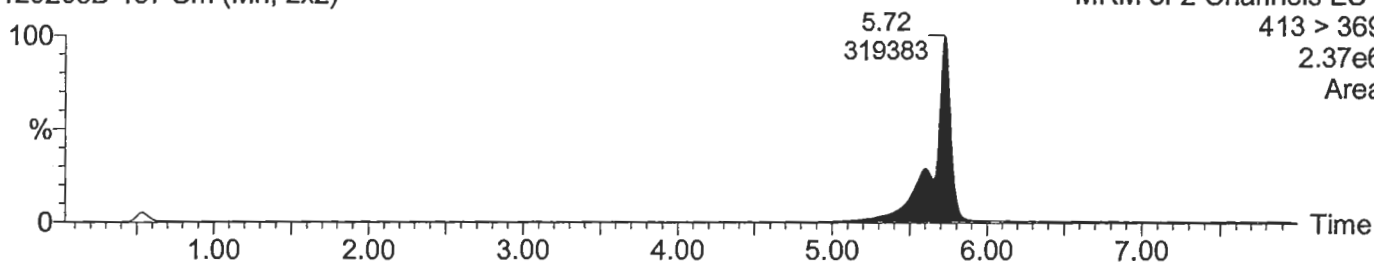
120205B-137 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

2.37e6

Area



2: 13C PFOA

C120205-3, 5.0 ng/mL standard

17-Dec-2005 19:44:07

LC/MS/MS #6

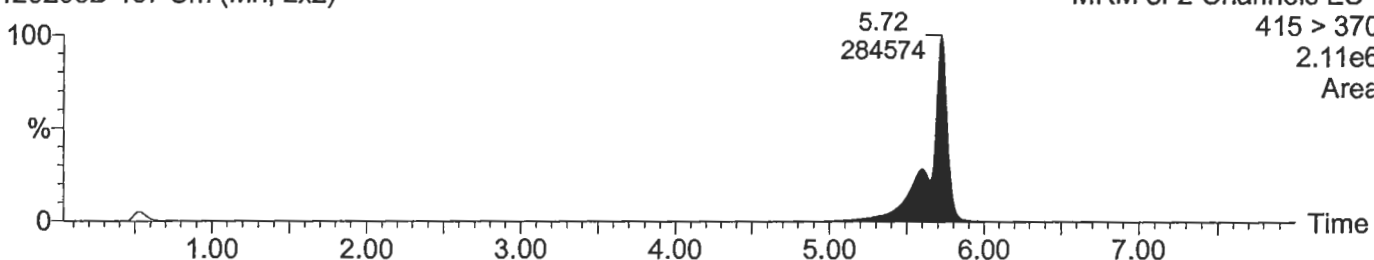
120205B-137 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

2.11e6

Area



Quantify Sample Report

Page 38

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

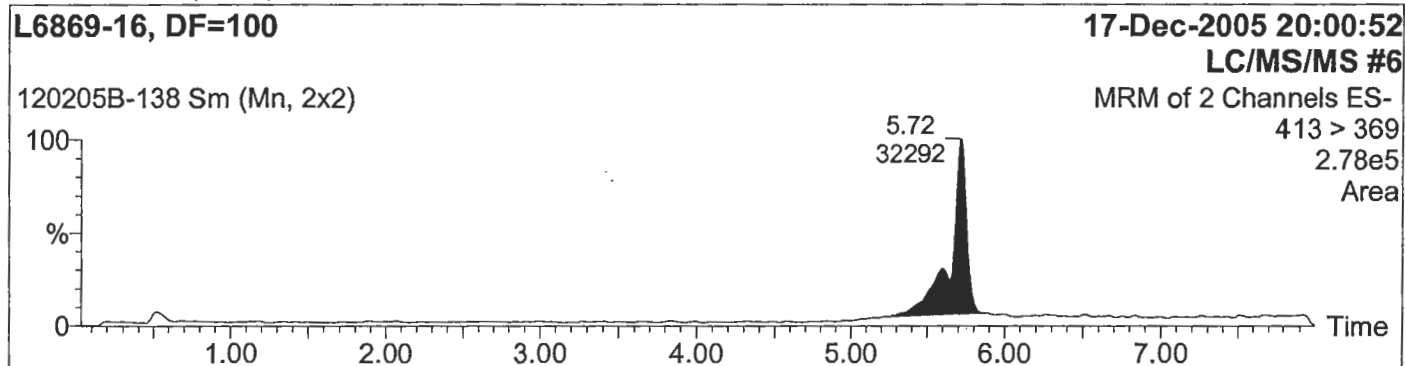
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

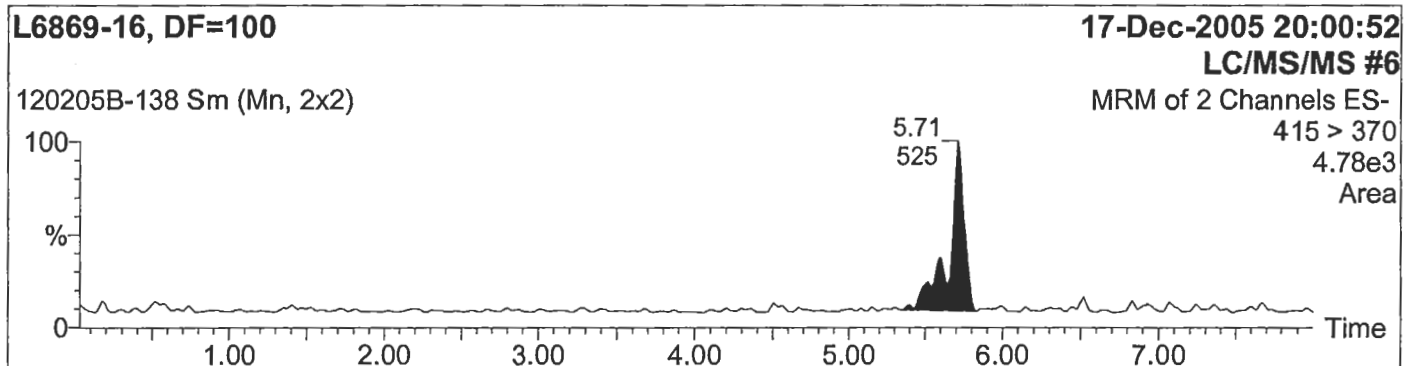
Name: 120205B-138

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 39

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

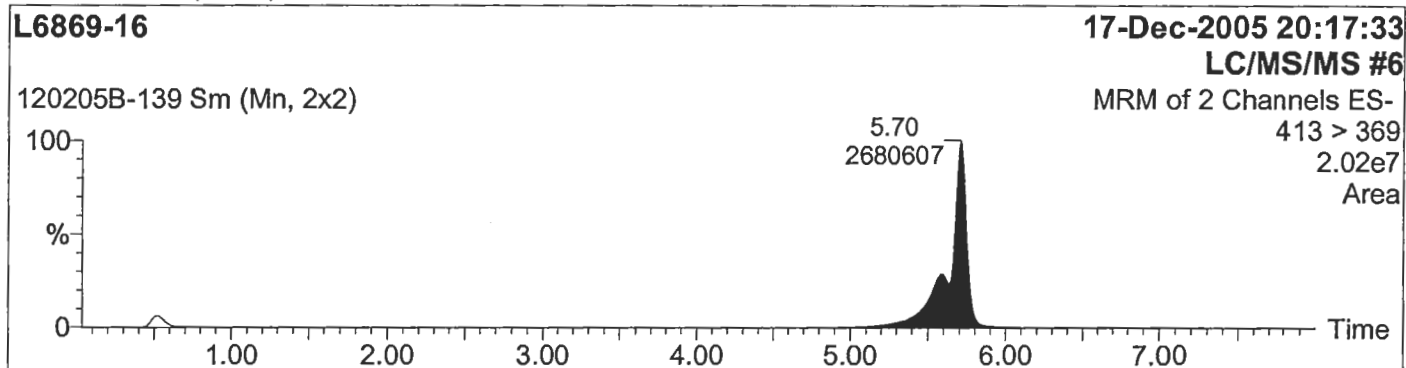
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

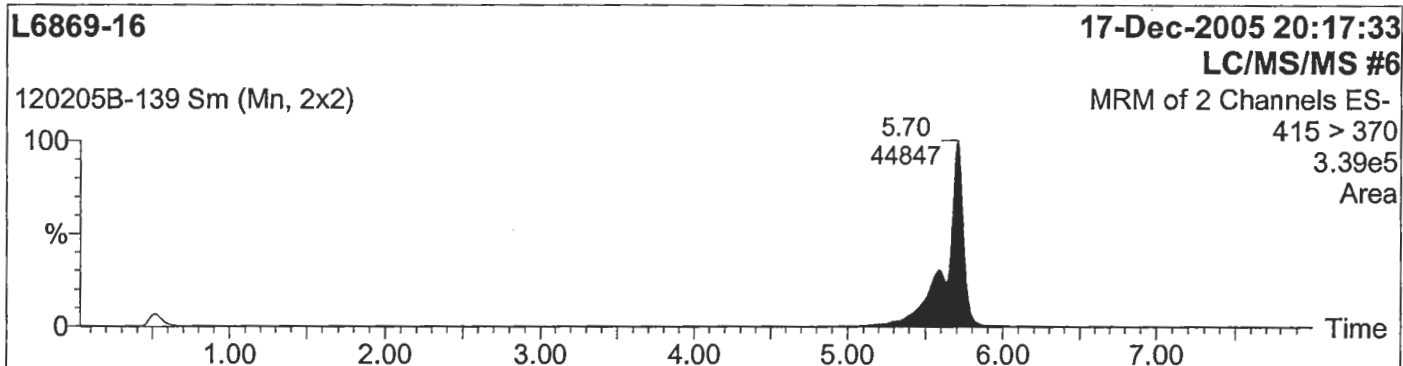
Name: 120205B-139

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 40

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

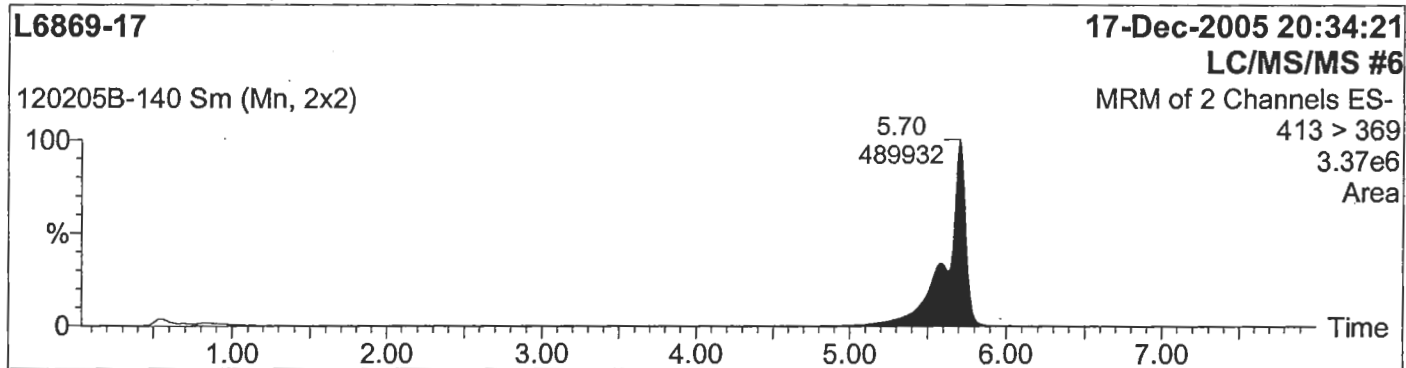
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

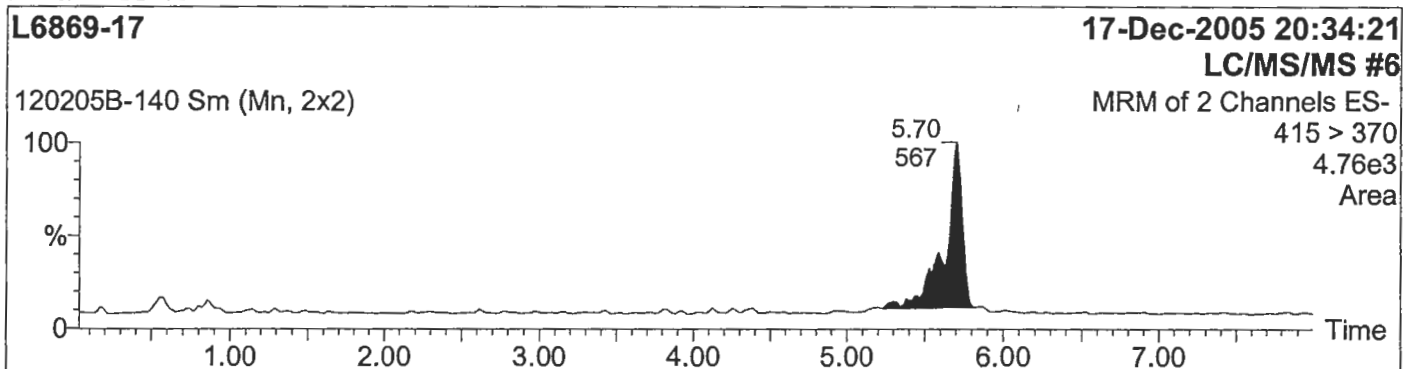
Name: 120205B-140

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

Page 41

Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

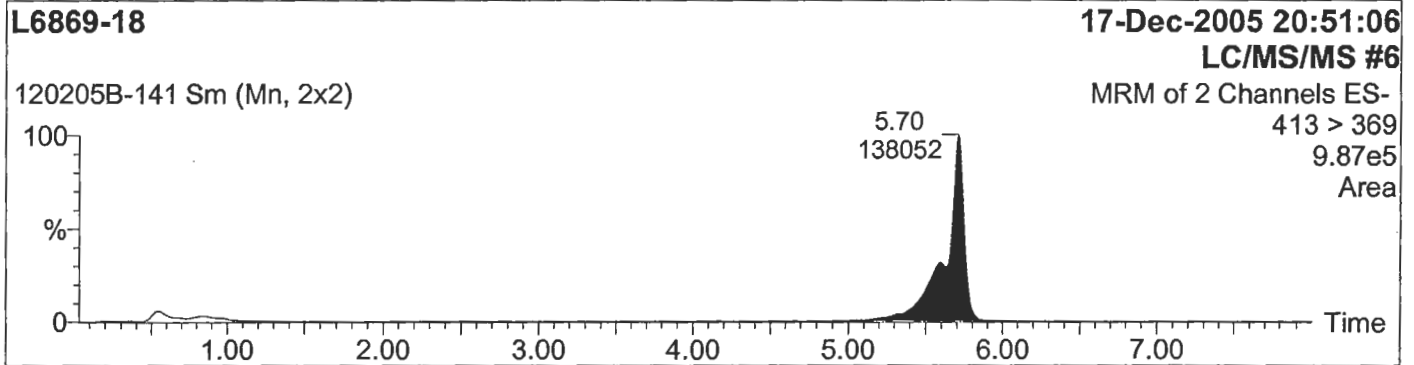
Job Code:

Printed: Wed Dec 21 12:46:01 2005

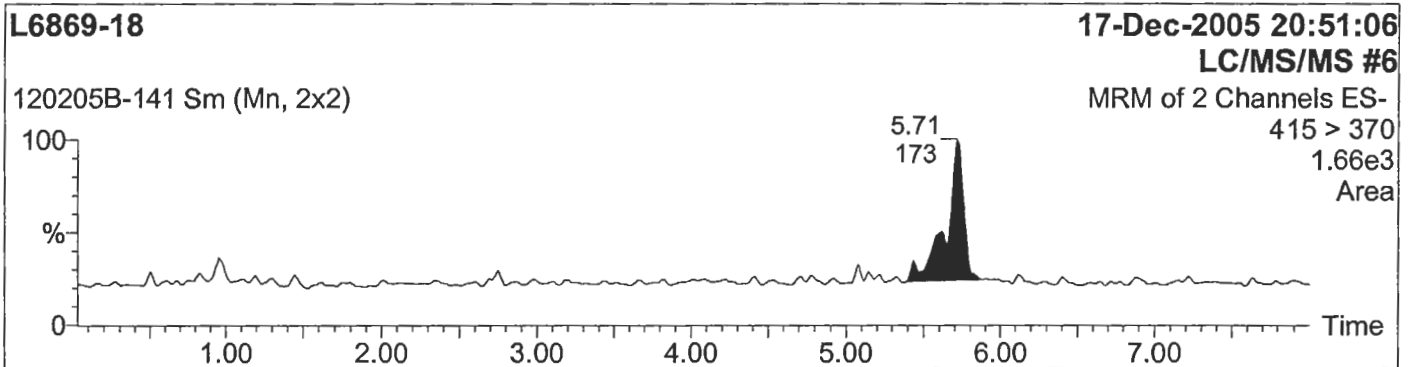
Name: 120205B-141

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

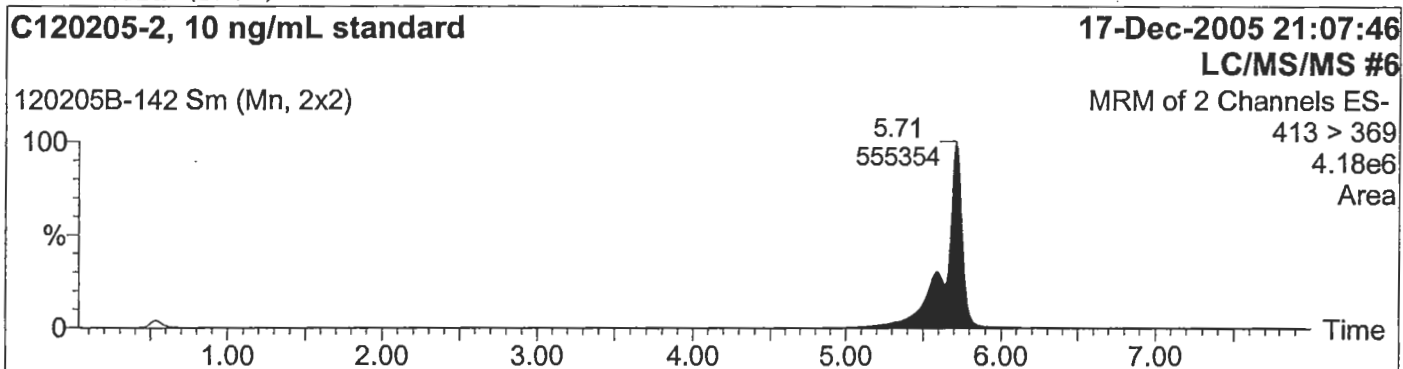
Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes
Last modified: Mon Dec 19 15:41:41 2005
Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:
Last modified: Tue Nov 29 08:48:19 2005
Job Code:

Printed: Wed Dec 21 12:46:01 2005

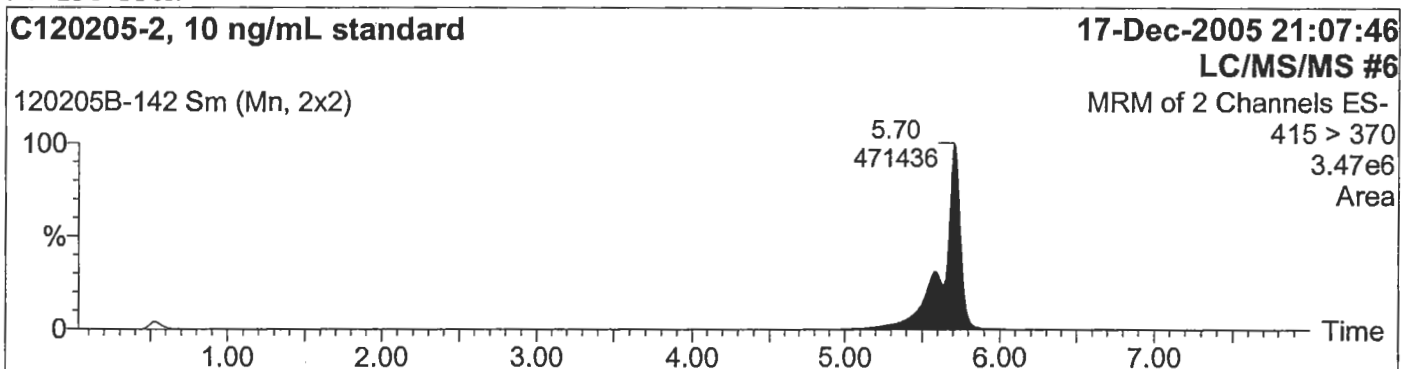
Name: 120205B-142

Text:

1: C8 Acid (PFOA)



2: 13C PFOA



Quantify Sample Report

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Study No.: L6869, Set No.: 120205B, Ext. Date: 12/02/05, Analyst: C. Edwards

Sample List: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\SampleDB\120205B OVS Tubes

Last modified: Mon Dec 19 15:41:41 2005

Method: P:\Data\LCMSMS6\Masslynx\Fluorochemicals.PRO\MethDB\PFOA 13C PFOA ng-mL 1:

Last modified: Tue Nov 29 08:48:19 2005

Job Code:

Printed: Wed Dec 21 12:46:01 2005

Name: 120205B-143

Text:

1: C8 Acid (PFOA)

C120205-1, 50 ng/mL standard

17-Dec-2005 21:24:28

LC/MS/MS #6

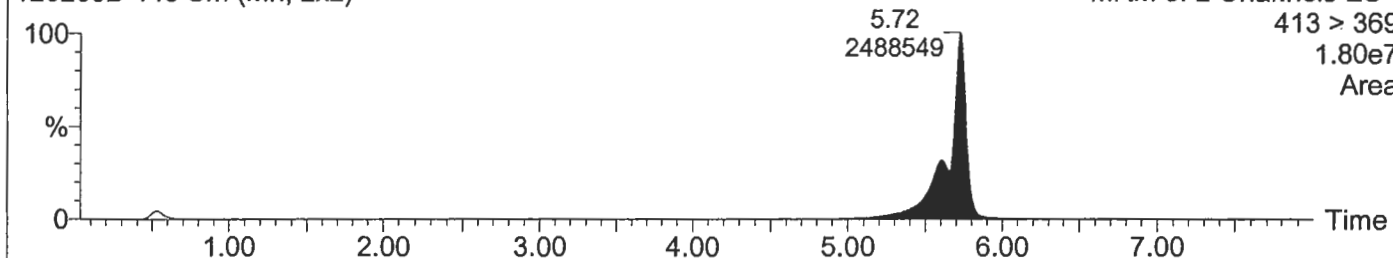
120205B-143 Sm (Mn, 2x2)

MRM of 2 Channels ES-

413 > 369

1.80e7

Area



2: 13C PFOA

C120205-1, 50 ng/mL standard

17-Dec-2005 21:24:28

LC/MS/MS #6

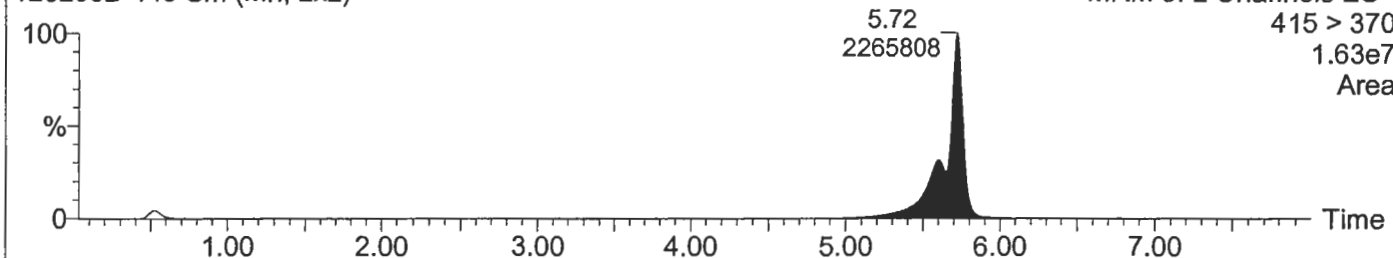
120205B-143 Sm (Mn, 2x2)

MRM of 2 Channels ES-

415 > 370

1.63e7

Area



Appendix C

Field Data Sheets



Monitoring Data Sheet

HiFlow Pumps

Project Name Whiteman, Osterman & Hanna LLC Test Date 11-22-05 TRZ

Project No. 32/01-002-001-002 Sample Location Building 4 lunch room

Pump Model SKL 224-PXZ8 Pump Serial Number 761054

BIOS DryCal DC-2 Flow Calibrator

Serial Number *B 924*

	Calibration Rate liters/min	Pump Rotometer liters/min	Tech / Notes
Pretest	1.008	1.0	Performed on 11/21/05 - checked 11/22 AM OK
Posttest	0.9993	1.0	Performed on 11/22/05 PM

Sample Media

Sample ID

Leak Check	Start Time	Stop Time	Elapsed Time (minutes)	Tech Initials
O.K.	0853	1553	420	TMR

Time

Observations

0853	Sampler located above Refrigerator in Lunchroom
1015	82 min / Flow O.K. NO employees present. ^{No safety glasses} on uniform vehicles.
1118	145 min / Flow O.K. No employees present.
1212	199 min / Flow O.K. 4 employees present.
1331	278 min / Flow O.K. 2 employees present.
1418	325 min / Flow O.K. 5 employees present.
1515	382 min / Flow O.K. No employees
1553	420 min / 2 2 employees present



Monitoring Data Sheet

HiFlow Pumps

Project Name Whiteman, Osterman & Hanna LLC Test Date 11-22-05 TMR
Project No. 32/01-002-001-002 Sample Location Building 4 over Room
Pump Model SKC 224-PLX128 Pump Serial Number 761074

BIOS DryCal DC-2 Flow Calibrator

Serial Number B924

	Calibration Rate liters/min	Pump Rotometer liters/min	Tech / Notes
Pretest	<u>1.008</u>	<u>1.0</u>	Performed on 11/21/05 - checked <u>WZAM</u> O.K.
Posttest	<u>0.9904</u>	<u>1.0</u>	Performed on 11/22/05 PM

Sample Media

Sample ID

Leak Check	Start Time	Stop Time	Elapsed Time (minutes)	Tech Initials
<u>O.K.</u>	<u>0902</u>	<u>1602</u>	<u>420</u>	<u>TMR</u>

Time

Observations

<u>0902</u>	<u>Located one end of oven 8 ~3' Above Dip Pan</u>			
<u>1018</u>	<u>76 min Flow OK</u>	<u>ovens 8, 10, 11 in operation. 5-6 employees in immediate area</u>		
<u>1121</u>	<u>139 min Flow OK</u>	<u>oven 8, 11 in operation. 4 employees in Area.</u>		
<u>1216</u>	<u>194 min Flow OK</u>	<u>oven 8, 11 in operation. 4 employees in Area.</u>		
<u>1334</u>	<u>272 min Flow OK</u>	<u>oven 8, 10, 11 in operation 4 employees</u>		
<u>1424</u>	<u>321 min Flow OK</u>	<u>oven 8, 10, 11 in operation 4 employees</u>		
<u>1518</u>	<u>376 min Flow OK</u>	<u>oven 8, 10, 11 in operation 5 employees</u>		
<u>1602</u>	<u>420 min</u>	<u>oven 8, 10, 11 in operation 3 employees</u>		

Sample may have been "salted" by employees early in sample period. white fluoropolymer dust sprinkled near/around pump site of unknown origin.



Monitoring Data Sheet

HiFlow Pumps

Project Name Whiteman Osterman & Hanna LLC Test Date 11-22-05 T1 R4

Project No. 32/01-002-001-002 Sample Location Building 5 over Room

Pump Model SKC 224-PL x128 Pump Serial Number 761017

BIOS DryCal DC-2 Flow Calibrator

Serial Number B 924

	Calibration Rate liters/min	Pump Rotometer liters/min	Tech / Notes
Pretest	1.009	1.0	Performed on 11/21/05 - checked 11/22 AM O.K.
Posttest	0.9869	1.0	Performed on 11/22/05 PM

Sample Media

Sample ID

Leak Check	Start Time	Stop Time	Elapsed Time (minutes)	Tech Initials
O.K	0910	1611	421	Tm R

Time

Observations

0910	Located between oven CF & CK	
1025	71 min Flow O.K.	ovens CB, CI, ^{CB} operating. CS, CK, CE , CD Being setup. 4 employees in area
1126	135 min Flow O.K.	ovens CB, CL, CI operating. CK idled. 4 employees in Area.
1219	188 min Flow O.K.	ovens CB, CL, CI, CK operating 4 employees in Area
1337	266 min Flow O.K.	ovens CB, CL, CK, CI, CS operating. 3 employees.
1426	316 min Flow O.K.	ovens CB, CK, CS operating 3 employees
1520	370 min Flow O.K.	ovens CB, CK, CS operating 4 employees
1611	421 min	ovens CB, CL, CK, CS operating 6 employees



Monitoring Data Sheet

HiFlow Pumps

Project Name Whitman Osterman & Hanna LLC Test Date 11-27-25 TUES

Project No. 32 / 01-002-001-002 Sample Location Building 6 Over Room

Pump Model	500 224-12X128	Pump Serial Number	761019
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BIOS DryCal DC-2 Flow Calibrator

Serial Number *B 924*

	Calibration Rate liters/min	Pump Rotometer liters/min	Tech / Notes
Pretest	1.008	1.0	performed on 11/21/05 - checked 11/22 AM O.K.
Posttest	0.9967	1.0	performed on 11/22/05 PM

Sample Media

Sample ID

Leak Check	Start Time	Stop Time	Elapsed Time (minutes)	Tech Initials
O.K	0924	1624	420	TMR

Time

Observations

[illegible]

Appendix D

Project Participants

Project Participants

Oxygen Research

Jay Bernarding – Business Development Manager

Barr Engineering Company

Tim Russell – Vice President/Chemical Engineer

Beth Havlik - Vice President/Chemical Engineer

Karen Stoller - CIH

Richard Berg – Senior Air Quality Technician